Practical treatise on the diseases of children and infants at the breast : including the hygiene and physical education of young children / translated from the French of M. Bouchut, with notes and additions, by Peter Hinckes Bird.

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Practical Treatise

ON THE

DISEASES OF CHILDREN

AND

INFANTS AT THE BREAST.

ORNOELLE

PRACTICAL TREATISE

ON THE

DISEASES OF CHILDREN

AND

INFANTS AT THE BREAST;

INCLUDING THE HYGIENE AND PHYSICAL EDUCATION OF YOUNG CHILDREN.

TRANSLATED FROM THE FRENCH OF M. BOUCHUT,

With Notes and Additions,

BY

PETER HINCKES BIRD, F.R.C.S.,

Author of the Jacksonian Prize Essay for 1849—on Erysipelas.

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PREFACE.

The waste of infant life in our large cities, amounting to forty-five per cent. of the total deaths, need not be insisted upon to enforce the importance of the study of the diseases of children; these affections, moreover, possess much interest, involving as they do a new symptomatology, a new pathology, and a new system of treatment; one is therefore astonished that it is not made a special branch in a course of medical study, but is either cursorily dismissed, or, as is more usually the case, entirely omitted; yet doubtless the student's time might be more profitably employed, as regards the real aim and intention of his profession, in the investigation of these diseases, than in the pursuit of the more minute branches of anatomy, chemistry, or botany.

Notwithstanding that we are in the possession of admirable works by West, Churchill, &c., and various monographs on several special affections, English medical literature was yet deficient in a complete treatise on children's diseases, and especially one including those of infants still at the breast, whose frail existence is so frequently menaced. Our continental brethren, enjoying the extensive experience derived from their large hospitals devoted to infantile disease, are far beyond us in all that relates to its pathology; and the work of M. Bouchut, embodying as it does the practice of Professor Trousseau, appearing to me a most practical and perfect treatise, my attention

has been directed to its translation, after having obtained the author's sanction.

The first part includes the hygiene and physical education of young children. As prophylaxis, or the prevention of disease, forms the most noble aim of our science, this subject is most important, but it must be owned, is one which has been too much neglected by medical men. In this part lactation by the mother and nurse is fully described, and the important question of the influence of anterior and actual diseases of the nurse on the health of children.

The second part comprises the general pathology of infancy; the external characteristics of infantile disease, and the study of the physiognomy, gesture, attitude, cry, &c., for the diagnosis of these diseases.

In the third part all the diseases to which children are subject, both medical and surgical, will be found systematically arranged and described.

Various notes, distinguished by smaller type with the addition of initials, have been added where there seemed occasion for the expression of the opinions and practice of other continental and English writers; for these I must confess myself much indebted to the work of West, and to the various able articles on pædiatrics contained in the *British and Foreign Medico-Chirurgical Review.*

The weights and measures have all been reduced to the corresponding English ones, except in some very few instances of tabular arrangement.

P. H. BIRD.

1, Norfolk Square, Sussex Gardens, Hyde Park, London.

January, 1855.

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A PRACTICAL TREATISE

ON

THE DISEASES OF NEW-BORN INFANTS

AND

CHILDREN AT THE BREAST.

Part I.

ON THE HYGIENE AND PHYSICAL EDUCATION OF YOUNG CHILDREN.

We daily observe men, very skilful in the art of rearing domestic animals, who can at will, so to speak, improve their breed and constitution, with the aim of obtaining from them products as numerous as they are varied, and services which they would be incapable of rendering without a special preparation. Some they train for draught, and the race; some for the chase, and defence; some for the labour, milk, and flesh, which they supply; and, lastly, certain others for fighting. Men even, urged by the love of gain, train themselves, at their pleasure, either for boxing or running; and all these results, so opposite and varied, are effected by a gradual and complete modification of the organism, under the influence of regimen, exercise, place of abode, and, in a word, of all those circumstances that a system of hygiene, well understood, enables them to turn to advantage.

With these facts before us, which are sufficient to prove the extent of the influence exercised by education or hygiene on man and animals, it may be asked, if it is possible that the human species can have so little regard for their preservation, as not to put in force, on their own account, the means which they employ for the preservation and improvement of the animal race. We are astonished at not observing the art of bringing up children, cultivated in a special manner, similar to that of rearing domestic animals. We are, moreover, surprised at finding how little is known concerning the hygiene of infants, and how much the precepts relating to their education are neglected by medical

men, who, in this respect, perhaps, are less informed than a great number of mothers of families, or of nurses.

The physical education of children is, then, a most interesting subject of study to the medical man. From the cradle man must be taken in order to make him a robust and vigorous citizen, and to modify his constitution, if, perchance, it is vitiated in its origin. It is during infancy, especially, that strict attention to the laws of hygiene is necessary, whether it be to preserve the health, or to reëstablish it when disease has interrupted its course. The knowledge of these laws is the more important, inasmuch as we have often to contend against established errors in the method of bringing up children. How can we successfully accomplish this, if we do not possess a profound knowledge of the subject under consideration?

This study, moreover, is necessary to the medical treatment of children, which depends almost entirely on their physical education. It is often sufficient to regulate the regimen, or to prescribe the observance of certain laws of hygiene, to cause some morbid symptoms to disappear, which we should treat in vain by the use of therapeutic means. Thus, more than once, by properly regulating the hours of lactation in young children, I have caused the cessation of the vomitings, and the green diarrhœa, which resulted from a too abundant alimentation, and from the breast being given too frequently. It is in consequence of an improper regimen, that the nutrition of some children is so altered; that their bones soften, and they become rickety. In many circumstances, analagous influences act in the same manner in the production of other diseases. To these we shall refer at a suitable opportunity.

The knowledge of the precepts relating to the physical education of children is, then, indispensable to the practitioner who would treat the diseases of this tender age; on this account we feel ourselves compelled to refer to them in this treatise, before considering the pathology of infancy. Our work would be incomplete did it not contain the substance of our knowledge on this subject.

We shall successively study—

1. The care which women ought to take during pregnancy with respect to their infant.
2. The attention to be given after birth.
3. The alimentation of children; choice of the nurse; the milk—its qualities and changes; the regimen of children; and weaning.
4. Habits, games, exercise, and sleep.
5. Clothing.
6. Attention to cleanliness.
7. The influence of antecedent and actual diseases of mothers and nurses on the health of children.

CHAPTER I.

ON THE CARE WHICH WOMEN OUGHT TO TAKE, DURING PREGNANCY, WITH RESPECT TO THEIR INFANT.

All treatises on midwifery include a detail of the precautions which should be taken by women during pregnancy for the management of their health; but there is, in general, too little notice taken of the influence which the errors of regimen and the imprudences of pregnant women may exercise on the state of the fœtus. It is to be desired, for the sake of science, that a good monograph could be had, which would indicate the action of the different maladies of the pregnant female on the product of conception. We do not yet know, in a positive manner, what injury is sustained by the fœtus—first, under the single influence of some serious affection of the mother, and, afterwards, under that of the therapeutic agents employed against that affection.

Pregnant women ought to take great precautions, and to submit to a particular mode of life, out of regard to their health, and in order to prevent abortion and the serious affections which sometimes occur after it. They ought to discontinue running and dancing, and forbid themselves exercise in a vehicle that is badly hung; in a word, they should avoid all violent movements which shake the viscera, and which might be the cause of the accident of which we have just spoken. They should have clothes sufficiently large, so as not to hinder the increase of the abdomen, and they should wear woollen drawers, in order that the abdomen, which pushes out the dress, and the lower part of which is then exposed to the cold air, may not be injuriously acted upon by that agent. They should, also, banish from their food all aliments too much seasoned, or of an exciting nature; and use with moderation all alcoholic or stimulating beverages, such as tea, coffee, and wine, which accelerate the circulation in a manner which is dangerous to the fœtus.

Women should be directed in these matters by an experienced person, who would regulate their diet in a suitable manner, and instruct them with respect to their clothing, as to the danger which results to the infant, and to the development of the nipples, from the constriction of the abdomen and breasts by tight stays. The practitioner ought to advise them to take exercise in the open air in all seasons, but especially when it is sunny, and to forbid walking to such an extent as to induce fatigue. In this manner, women are not captives and kept in absolute repose, as is sometimes directed:

and their mode of life is in accordance with their situation. It is for them to follow these precepts, so as not to compromise their health, and that they may, at the end of their pregnancy, bring forth a robust and well-formed infant. What I have just said respecting stays induces me to recommend to women, who purpose nursing, a very great attention to the development of the nipples. Besides leaving off their stays if they compress the nipple, they ought, also, if this part is but slightly prominent, or contracted, to endeavour to make it project. They may succeed in this by causing their husbands to employ suction, or by practising it themselves with a glass tube, made for this purpose.

The accidents of pregnancy, which may affect the health of the fœtus and occasion its death, are syphilis, blows on the stomach, and falls on the seat, plethora, very intense mental impressions experienced by the mother, and the various maladies by which she is affected.

The death of the fœtus is often the result of blows on the abdomen, or of the falls which women meet with. This is a fact generally admitted, and on which it is useless to speak further. If pregnancy be advanced, and the fœtus have manifested its presence by internal movements, these movements cease, and, at the end of a few days, abortion ensues.

Practitioners readily recognize the accidents caused by plethora, which occur during the course of pregnancy. This condition is, moreover, characterised by such evident symptoms, that it is often impossible to mistake them; but what is less known, is the influence of plethora on the product of conception. In this state, the uterus is strongly contracted, and presses more than usual on the fœtus, the limbs of which are sometimes, by reason of this contraction, kept in an unnatural position. A great number of congenital deformities result from this, which might, perhaps, be easily prevented by bleeding. In fact, after this little operation, women almost always experience an improvement in their state, and the greater number declare that, under its influence, the movements of the infant become more frequent, more lively, and, in some degree, more easy. If this be so, it must be granted that plethora has not only its disadvantages for the mother, but also for the infant which she carries in her womb.

Very lively mental impressions are especially hurtful to the mother, even more so than to the infant. There is, during pregnancy, such an increase of sensibility, that serious events may throw women into a very extraordinary, and sometimes into a very dangerous state of irritation. Some actually fall into a state of complete mental alienation, and commit the most extravagant actions. As to the longings, as they are vulgarly called, of pregnant women, there is no impropriety in satisfying them when they are not unreasonable; but there should

be no hesitation in opposing them when they are ridiculous caprices. There is nothing to be feared from this course; the female comforts herself, and is contented when she finds it impossible to be gratified; and the infant does not feel the influence of the mother's disappointment.

All the fables which have been put forth on the subject of the diseases of the fœtus, caused by the longings of the mother, are controverted by observation. The mother marks, and defects in the conformation of children, which were formerly referred to this cause, depend on circumstances entirely different. There is not a woman who, during pregnancy, has not had caprices and longings unsatisfied, and, notwithstanding, when her time arrives, the child comes into the world without bearing on it the deformity which should bear witness to the disappointment of the mother. When, on the contrary, the infants are deformed, and the number of them is small, in comparison to the number of births, searches and interrogations are made, and the conclusion is, that some day or other the mothers had such a fancy or such a desire. It is thus, in general, that those extraordinary histories are fashioned, to which no one in the present day gives any credit.

[There seems reason to believe, however, in the occasional origin of deformities in the fœtus from vivid external impressions acting through the imagination of the mother. Boerhaave (*Aphor.* 1095) speaking of the causes of epilepsy, says that the tendency to this disease may be "born with one, from the imagination of the mother when she was pregnant, being shocked at the sight of a person in an epileptic fit." Whitehead (*On Hereditary Diseases*, p. 16) relates some cases in confirmation of this view. In one case which happened to him; a lady was in great dread, in five successive pregnancies, of her children being born blind, on account of her sister's eldest child having had this congenital defect in the left eye. The result of these pregnancies is thus summarily stated: out "of five children, born at the full term of utero-gestation, each as remarkable for plumpness and vigour as the mother is for a well-developed frame and robust health, the first, third, and fifth of her children had defective development of the *left* eye, amounting in one to deformity; and the second and fourth had complete loss of vision of the same side."

A young woman, in the sixth month of pregnancy, caught a full view of a double hare lip while under operation; she fainted; and at the full time of utero-gestation, was delivered of a well-grown female child, who had double hare lip and cleft palate, like the one she saw three months before. No such deformity had been previously known, either in her family or in that of her husband.

A lady, in reduced circumstances, had borne four healthy children at full term. She possessed a robust constitution, and was descended of a healthy stock, both as regards body and mind. Her husband and his family had been similarly favoured; but he, from being a faithful and affectionate companion, became dissipated and cruel. When five months advanced in her fifth pregnancy, the unkindness she received from her husband threw her into a state of great mental distress and despondency, during the prevalence of which she attempted to destroy herself by drowning, but was opportunely rescued. She was delived at the full term of utero-gestation, of a boy, who survives, but who is completely imbecile. She then bore a female child, who also survives, and is perfectly healthy. She had then an abortion, in the fourth month, and died nine months afterwards of malignant disease

of the uterus. Neither idiotcy nor malignant disease had been previously known in the family of either parent.

It would, moreover, appear that powerful impressions operating upon the mother are capable of producing corresponding effects upon the fœtus in utero, independently of the imaginative faculty, in evidence of which Mr. Whitehead relates the following case: A woman in strong mind, in competent circumstances, thirty-two years of age, and in the seventh month of her sixth pregnancy, had occasion to visit the shop of a grocer, and while she was in the act of delivering her orders, a heavy weight fell upon the instep of her left foot. She was in great pain, and, being unable to walk, was immediately carried home in a conveyance. Whilst sitting with the injured limb in a foot-bath, she felt a sudden and violent struggle within her, followed, on the instant, by a plentiful escape of water, per vaginam, which was the liquor amnii. She was placed in bed, and a medical man sent for; who, finding the pains of labour strong and frequent, and a foot of the fœtus already low down, proceeded to deliver. The child (female) was puny, but alive, and apparently healthy. Its left foot, which had been the first to present, was found to be firmly contracted towards the inner aspect of the limb, the heel being raised, and solei muscles rigid and unyielding. This state of parts continuing, the foot was forcibly brought into its natural position, and there maintained by means of a bandage, and thus its use and symmetry were eventually restored. After some ineffectual efforts to bring away the placenta, the abdomen was examined, and it was found that another child remained in the uterus, the birth of which was hourly and daily waited for. In the course of ten days, no indications of labour coming on, the patient was sufficiently recovered to attend to her household duties, and continued to do so until the completion of the natural term of pregnancy, when she was safely delivered of a full-grown male child, in vigorous health. This event happened precisely sixty days after the preceding birth. No milk appeared in the breasts until after the second birth, when she was enabled to nurse both children. The twins are still living, and in perfect health.

Broadhurst (*Medical Times and Gazette*, 1853) gives the following instance of the effect of mental emotion on the fœtus. A woman, during the sixth month of pregnancy, suffered from sudden and intense fear; by a powerful muscular effort she saved her life. For four days after this occurrence she believed her child to be dead, as it remained motionless. After this time, however, it again began to be felt, and, in a few days, its movements were as distinct as before the accident. The child was born at the eighth month, with the most severe talipes varus and cheirismus.

One effect of the siege of Landau, and of the explosion of the arsenal was, as we are assured by those who were present, that of ninety-two children who were born soon after, fifty-nine died in consequence of their mothers' alarm, others lived a few months only, some few were idiotic, and, again, others were born with numerous fractures of the bones.—P.H.B.]

The diseases of the mother during pregnancy have each their influence on the product of conception. As we have said, this subject will be treated in a separate chapter, at the same time with all that relates to the influence of the nurse on the health of infants. It is sufficient to say, that amongst these diseases, some determine abortion; these are cholera, confluent small pox, severe typhoid fever, syphilis, certain non-syphilitic fungous excrescences at the neck of the uterus, excessive leucorrhœa, &c.: others affect the health of the fœtus; these are slight small pox, syphilis, scrofula, and some chronic diseases; and

finally, there are a few, amongst which pneumonia must be placed, which seem to have but a slight influence on the health of infants.

It has been observed, but incorrectly, that mercurial treatment is a cause of abortion; this is a serious mistake; it is on the contrary the best preservative against it from the moment it cures syphilis, which is its most frequent exciting cause.

CHAPTER II.

ON THE ATTENTION REQUIRED AFTER BIRTH.

The accoucheur gives his first attention to the infant by tying the cord; he removes, by means of a bath, all the greasy matter from the skin, examines the conformation of the natural openings, and directs the first clothing of the new-born infant. He should attentively investigate the health of the father and mother in order to become acquainted with the infant's constitution, and thus be enabled to give adequate directions as to its hygiene and aliment.

The medical man is, in fact, often consulted by the mother to ascertain if she is able to nurse her infant; if the state of her health is opposed to it; if the condition of the breasts will allow of it; and, finally, as to the selection of a nurse in those cases where they are not considered fit to undertake suckling.

Everything relating to the nurse, and to feeding, will be treated of in a special chapter; in this, we shall only occupy ourselves with the health of the mother, who is disposed to nurse her infant herself, in reference as much to the future qualities of the milk, as to the conformation of the breasts.

How may it be known if a Woman is able to nurse her Child?

When the constitution of women is deteriorated by any general malady, easy of discovery, or the possible development of which is indicated by hereditary antecedents, they must not be permitted to undertake the suckling of their infants. To this end, too much prudence cannot be exercised for timely remedying the original vitiation of the constitution, and for correcting, by the aliment given by a healthy wet nurse, the hereditary vices which, sooner or later, will develop themselves in the children.

Women, who by too close a consanguinity, belong to a tuberculous, cancerous, rickety, gouty, or syphilitic race, ought to reflect deeply before giving the breast to their infant. If they present *any symptom* of these affections, they should be positively interdicted from suckling.

The health of the father ought also to be taken into consideration, for it is possible that an alliance or *crossing* with a more healthy race has imprinted on the fœtus a vitality altogether different from that which would result from an alliance between two races vitiated either in their origin or constitution.

The practitioner must know how to estimate the qualities of the product of conception from the health of the father and of the mother; and to determine if the unfavourable constitution of the mother may have been corrected by the impregnation of the father, and vice versâ. In cases where any doubts may remain on his mind, there is but one method of settling the question, and that is, by committing the infant to a wet nurse.

Apart from this general condition of the mother, her actual constitution or hereditary disposition, there are women whom we may consider competent to suckle their children, and who are, nevertheless, unable to undertake this duty. We judge of this condition from the characteristics of the mammary secretion at the last period of pregnancy: although it must be admitted that these characteristics, to which we are about to allude, only possess a very limited value. They cannot by their absence determine the conduct of the practitioner, so as to decide if the woman should, or should not, suckle the child herself. When, on the other hand, they do exist, they should be taken into deep consideration.

There are some women whose constitution is evidently vitiated, who, before delivery, have a satisfactory mammary secretion, and who yet should not suckle. In this number must be reckoned tuberculous women.

There are others, on the contrary, tuberculous or non-tuberculous, who present before delivery an altered mammary secretion, on account of which they may be considered incapable of undertaking lactation.

What are the characteristics of the Secretion of the Breasts before delivery?

We shall here make an extract from the excellent treatise of M. Donné.* This physician has treated the question now under consideration in so satisfactory a manner as to leave nothing to be desired.

"It is known that from a more or less advanced stage of pregnancy, often even from the commencement of conception, a preparatory process takes place in the mammary gland, whence a certain quantity of yellowish viscous matter results, which can be expressed by a moderate degree of pressure, carefully exercised on the organ; it is to this imperfect milk that the name of *colostrum* has been applied in medicine.

* *Conseils aux mères sur l'allaitement et sur la manière d'élever les enfants nouveau-nés.* 2nd édit. Paris, 1846. p. 38.

Sometimes this secretion is so abundant, that it escapes naturally, and of itself, by the nipple."

M. Donné has proved that a nearly constant relation exists between the nature of this liquid, secreted during pregnancy, and the milk as it is secreted after delivery. From the examination of the *colostrum*, and of its principal characters, it may be predicted what will be the character of the secretion of milk, its *essential qualities*, and its quantity. As M. Donné has remarked, there is nothing in this which should create astonishment, for it is the same organ which produces the milk and the colostrum, and it is easy enough to discover a relation between these two liquids.

As I have already observed, we sometimes meet with women, originally incapable of suckling, in whom the colostrum appears to possess satisfactory qualities, and who, nevertheless, should not nurse their children. Consequently, these characters, highly important as they are, do not possess an absolute value. If they are to be taken into consideration, we must, at the same time, attend to the state of the constitution of women who wish to suckle. In fact, this subject is one of those which merits the greatest attention from the practitioner.

In order to discover the future qualities of the milk, from the examination of the colostrum, it is necessary, as M. Donné states, to divide the women into three categories. "In the first are found those in whom the secretion of colostrum is so scanty, that we can scarcely obtain a few drops of it, at the termination of pregnancy, by pressure on the mammary gland. If colostrum, in this condition, is examined by the microscope, it is observed to contain a small number of imperfectly formed milk globules, and some granular bodies.* In these cases the milk will be almost certainly in small quantity after delivery—poor and insufficient for the nourishment of the child.

"The second category includes women whose mammary gland secretes an abundant colostrum, but fluid, watery, and flowing readily, like thin gum water, as poor as the preceding in milk globules, and in granular bodies; in these cases the woman may have an abundant supply of milk, but it will always be poor, watery, and without body.

"Lastly, when, at the termination of pregnancy, the secretion of colostrum is very abundant; when this fluid contains a more or less thick yellow matter, contrasting by its consistence and its colour with the rest of the liquid, in which it forms yellowish striæ; when it is rich in well formed milk globules, and combined with a greater or less quantity of granular bodies, it is almost certain that the woman will have a sufficient quantity of milk; and that this milk will be rich in nutritive principles, that it will possess, in a word, all *materially* essential qualities."

* To these bodies, which constitute a part of the colostrum, we shall again refer.

As for the virus or morbid principles which it may contain, whether syphilitic, tuberculous, or otherwise, they escape microscopical analysis, and the state of the constitution must be referred to in order to discover their existence. The practitioner should then extend his inquiries beyond the results furnished by the physical or chemical examination; and besides having regard to the characteristics of the colostrum, he should especially take into consideration the *health of the mother*, in order to decide if she should suckle her child.

On the Conformation of the Breasts.

There is a considerable number of primiparous women, whose breasts are sufficiently large, but whose nipples are flattened, shapeless, and buried in the mammary gland. This state of parts is a very common one, and is very troublesome to those women who wish to suckle their children. It results from the compression exercised on the breast by the stays, which are a little too high, and the gussets of which are too narrow to allow the breast to develop itself freely. This condition should be remedied early, as it is one which always hinders, and sometimes prevents, lactation; for the child has no hold on which to exercise suction, and exhausts itself in useless efforts to draw out the milk which is contained in the breasts.

It is in the course of pregnancy, during the last months, that women should get the nipple into shape. This they may readily accomplish themselves by occasionally exercising suction of this part, by means of a glass tube with a curved arm, which may be readily obtained, and which is made for this purpose. This proceeding is sometimes painful, and some women cannot bear the application of it; the husband ought then to endeavour, by means of gentle and moderate suction, to give to the nipple that prominence which is proper for lactation.

CHAPTER III.

ON LACTATION.

Children are only nourished by milk during the first months following birth. It is the nourishment which suits them best, and which nature has destined for them. Some draw it by suction from the *breast* of their mother, of their nurse, or from the *teats* of an animal; others from a *bottle* called the *feeding bottle*, the orifice of which, made for this purpose, is pierced by a small opening; or they drink it from the *glass* which is offered them.

These methods of alimentation, are collectively comprised under the term lactation; but the lactation by the mother and the nurse, must be

distinguished from the *artificial* lactation which is effected by means of a glass, or of the feeding bottle.

On Lactation by the Mother.

If no obstacle of the nature of which we have spoken exists in the constitution or in the health of the mothers, they should be recommended to suckle their children. The delicacy of the figure should not be considered as an impediment to this duty; indeed, most of the women living in towns, frequently very delicate, but otherwise in good health, may fulfil this duty.

Lactation by the mother possesses, moreover, this advantage, that it is by far the most advantageous to the children. We see women of delicate appearance, whose milk is of a medium quality, rear their own children very healthily, and only make puny specimens of the strange children who are confided to their care in consequence of the healthy appearance of their nurslings.

When, then, no general vice which may hinder lactation exists in the constitution or in the health of women, they should, having the interest of their progeny at heart, sacrifice the world and its pleasures, and give the breast to their child.

As Désormeaux has remarked, the child should be presented to the breast of its mother as soon as she has recovered from the fatigues of the confinement, which last a greater or less time, according as the delivery has been more or less difficult. The movements of suction which it vigorously executes, the cries which it utters, sufficiently indicate the want it experiences; and what more suitable aliment can be offered than that which nature has prepared for it? At first it only derives from the breast a yellowish, slightly abundant liquid, known under the name of *colostrum*, and which, by its nature, is very fit to lubricate the internal surface of the intestinal canal, to induce, gently, its contractions, to dilute the meconium, and by this means to facilitate the expulsion of that matter. This liquid gradually acquires the appearance and the qualities of milk, and becomes more and more abundant. If the placing the child at the breast is deferred, besides the advantages it would lose derivable from the colostrum, the great distension of the breasts which takes place at the period of the milk fever would be an impediment to suction; it would be then necessary to wait until this tension had diminished. A weak and vigorous child could not endure these delays, and would become the victim of the ignorance or of the prejudices of those under whose care it is placed. There are, as we see, very good reasons why the child should be put to the breast at an early period—two, four, six, or eight hours after delivery; there are none why we should wait until after the milk fever, as some persons would recommend.

In the first days following birth, the children may be frequently put to the breast, for it is a difficult matter to satisfy them; but after the first few weeks, a greater interval should be allowed to elapse between the hours of lactation. Women should not be inconsiderately zealous to discharge their duty of nurse, and always endeavour to calm the cries of the child by giving it the breast; they should, having the interest of the nursling at heart, take care of themselves, and not exhaust their strength by too frequent lactation.

During the day, mothers should suckle their children every hour, or every two hours, at least; during the night they should train their child not to wake them to take the breast. This is very easily accomplished; they soon acquire the habit, and experience no injury from it. The mother then, finds in sleep a salutary repose after the fatigues of the day. She may enjoy from six to eight hours uninterrupted sleep, by giving the breast, for the last time, towards eleven or twelve o'clock at night; and by recommencing the next day at six or seven o'clock in the morning.

If, during this interval, the child awakes and begins to cry, in order to make it lose the habit of taking the breast during the night, a little good cow's milk, diluted with water gruel, should be given it. It is still better to endeavour by caresses to quiet and get it to sleep, so as to avoid its taking anything. This may appear rather hard to it the first night; but soon, accustomed to this method, it awakes and goes to sleep again without crying, for experience has taught it that tears would be useless. Mothers should, then, have the courage to hear their child crying a little; for without this, far from being their master, one is their slave, and is uselessly disturbed by them, and lactation is interrupted in consequence of the exhaustion of the nurse.

The mammary glands—which by their seat and form constitute the ornaments of the sex, become, by their functions, the source of a new existence, and are placed, by their structure, under the influence of the moral activity. We cannot, then, too strongly recommend to mothers who suckle their children, to endeavour to acquire the calmness and tranquillity necessary to the direction of a good education. But what words can one use to a woman whose heart thrills at the cries of her child, and whose mind is so deeply disturbed at them? Are we not fearful of seeing the heart get the better of the intelligence, and maternal passion triumph over reason? Nevertheless, the practitioner should deliver his firm and respectful dictum in the midst of these blind and exalted sentiments, which exercise the most disastrous influence on the health of the children.

The mother should be given to understand that the qualities of her milk are rapidly changed by violent mental emotions; and that tranquillity is absolutely necessary to her, in order that she may

become a good nurse. What matter the cries of a child which has had the breast to a sufficient extent at the proper hour; which does not suffer, and which experiences no want? If it cries, it is by caprice; we must learn to resist it; then it ceases, and learns for the future not to cry without a motive. In this manner it becomes docile, and its cries assume much value from the time when it is known that they are always a manifestation of suffering.

Method of causing the Milk to flow into the Breasts.

When a woman has but little milk, and absolutely wishes to suckle her child; or when an accident, a moral impression, or any other cause, has diminished or suspended the lacteal secretion to such an extent as to render lactation impossible, there are several means to which we may have recourse in order to quicken the secretion of milk; and one of these has been several times successful in my hands. These expedients, known under the name of *galactagogues*, have fallen into the greatest discredit; but, rather than allow the lacteal secretion entirely to dry up, is it not better, at the risk of want of success, to make use of remedies which are uncertain, but sometimes useful?

The mercurialis, the ricinus, the jatropha curcas, were formerly employed, and Tabernæmontanus made use of the pimpernel exclusively. All these plants should be used as cataplasms on the breasts. I have only had recourse to the ricinus communis of botanists, the leaves of which, to the extent of a handful, boiled in two or three pints of water until half dried, form a cataplasm, which should be retained in position for twenty-four hours. On one occasion, on the eighth day after the delivery of a lady whose supply of milk had become arrested under the influence of a very acute moral impression, this cataplasm reëxcited it. Another instance presented itself in a person of rather delicate constitution, who had a poor supply of milk; the same plan of treatment was successful, and under its influence a considerable increase in the lacteal secretion was observed.

On Lactation by Nurses.

When, in consequence of the conditions of health which have been before noticed, or from any other cause, the mother refuses to suckle the child herself, it should be intrusted to a nurse.

The choice of a nurse is a very difficult matter. Many women of Paris, or of the provinces, will undertake this office, but there are a great number of them who possess none of the necessary qualities to discharge this duty in a proper manner. Nurses should be selected from their external appearance, from their state of health, and from the examination of their milk.

A primiparous woman seldom possesses that experience which is

necessary in the rearing of children, especially if there is no one by her side to direct her. It is better to choose, for a nurse, a woman who has suckled other children.

We should first inquire into the period of the confinement of the nurse, that is to say, into the age of the milk. In fact, this liquid changes its character in proportion as the time from the period of delivery increases, and it is no longer suitable for the young child which has been just born. It does not possess the laxative properties of the milk first secreted after birth; it does not contain any colostrum; it is nearly always an indigestible and slightly abundant aliment, the use of which should not be recommended. It is said, it is true, that a young child renews the milk, because the breasts become distended afresh, and because nearly all the phenomena of milk fever are observed. This is incorrect, or at least is not proved by chemical and microscopical analysis. The enlargement of the mammary gland only takes place in this case, because the new nursling does not consume so much milk as the first one did.

We should always make choice amongst nurses of those who have been confined from about six or eight months, and whose age ranges between twenty and thirty-five years. They rarely possess the desirable qualities when their milk is older, and their age more advanced. A table, introduced further on, will demonstrate in a precise manner the influence of age on the composition of the milk. They should have brown or black hair, in preference to flaxen or red; these last have generally a large supply of milk, but it is serous, as the analysis of MM. Vernois and Becquerel demonstrate. They should possess rounded and plump figures; the bosom well formed, slightly firm, and marbled with blue veins; the gums of a good colour; and the teeth in good condition. However, the character derived from the soundness of the teeth does not possess so much importance as was formerly attached to it. There are women who have bad teeth, and who, yet, are excellent nurses. There are others, on the contrary, who, with very good teeth, have an enfeebled constitution, which prevents them undertaking lactation.

The red colour and firmness of the gums possess much more importance, in the eyes of medical men, than the soundness of the teeth. From the state of these parts, we judge of the strength of the subjects, their state of health, and, to a certain extent, the qualities of their blood. It is evident that colourless gums belong to a woman whose blood is watery and impoverished; who might, notwithstanding, be in a tolerable state of health, but who would always make a bad nurse.

It is necessary to make choice of a woman of a sweet disposition, and whose intelligence is sufficiently developed to superintend the

child which is intrusted to her care. Good humour in nurses cannot be too much sought after; it serves to amuse children, and to distract them from their sufferings. They then, consequently, assume habits of light-heartedness and cheerfulness, which have always a happy influence on the development of their mind and disposition.

Nurses should be carefully examined with respect to their constitutions, and to their health; they should even be inspected, as far as decency will permit, to assure ourselves that no cicatrix, nor mark exists, which indicates the actual or former existence of a rachitic, scrofulous, leprous, or syphilitic disease. The anus, genital organs, and interior of the mouth—parts which are especially the seat of the syphilitic disease, should be examined.

With respect to the nurses whom we examine, it is evident that we must take into consideration the same circumstances, which are admitted with respect to mothers, as preventing them from suckling; and we must seek—a difficult task—in their family and on their word, information which may throw some light on the existence of hereditary diseases. This investigation is often useless; the women know nothing about the subject, or pretend not to comprehend it. No positive result is arrived at. This is an additional motive for very great care in the local examination of the nurse who presents herself.

We must also be assured that the milk is sufficiently rich in nutritive elements, pure in its composition, and sufficiently abundant; this is very readily accomplished by means of chemical and microscopical analysis. However, we must not be mistaken on the value of these researches; they lead to valuable results as regards the material and physical qualities of the milk, but they give no information, if I may so express myself, *on the nature of the vital qualities of this liquid.* In fact, the milk secreted by a woman tainted with syphilis, does not differ, microscopically, from the milk of women of a gouty, lymphatic, or any other race. The virus exists in the milk, but it is there present in an imperceptible form, and no one has yet been able to demonstrate its existence except by its effects. Consequently, if it is necessary to examine the material richness, that is to say, the *physical and chemical qualities of the milk*, they should be compared with the *vital qualities*—a double appreciation necessary in the choice of the nurse.

Before treating of the characteristics of richness and of poverty of the milk, it is necessary to enter into some details on the nature of this liquid, and on its composition in its normal state.

On the Milk.

The milk contains the principal elements of the food. According to the idea of Dr. Prout, the milk is the type of perfect food.

It is understood that no substance can merit this title, that is to say, is capable of sustaining life and health, without it contains various salts, and at least two proximate principles, one combustible, the other of an albuminous nature.

In fact, the muscles, the cellular tissue, &c., of the animal, have not only to be repaired, but at the same time the necessity of calorification must be provided for; its bones, the nervous matter, the acid or alkaline humours, must also be renewed.

Thus the milk which is destined to constitute the sole nourishment of the young mammalia, contains the three kinds of substances alluded to, namely—

1st. An albuminous matter, the caseum.

2nd. Two combustible substances; one fatty, which takes the name of butter; the other, saccharine, called lactine or sugar of milk.

3rd. Mineral substances dissolved in water; amongst which must be mentioned chloride of sodium, alkaline and earthy phosphates, and the oxide of iron.

These constitute the elements of the milk; but a precise idea of this secretion will only have been obtained, when we state in what condition these substances are there observed. To arrive at this information, microscopical and chemical analysis are absolutely necessary.

State in which the principles of milk are observed. It may be observed that the milk is composed of a liquid and of a solid portion; or if you will, that it is water holding globules of butter in suspension, and caseum, sugar of milk, and salts in solution.

The globules of butter are characterized by being spherical, smooth, perfectly transparent (when they are isolated), and limited, as it were, by a black circle, which is only the effect of the refraction of light. By their coalescence, they form white masses; it is their larger or smaller number which gives to the milk its greater or less degree of opacity.

These globules, which may attain the diameter of about 0.01 of a millimètre, are only visible by means of a powerful instrument. Moreover, in the same milk, they possess a very variable size, and no very great difference is to be observed, in this respect, between one kind of milk and another.

Normal matters: but which may be considered as accidental in the milk. The globules of butter, usually isolated or free, sometimes coalesce into small groups, doubtless by means of a mucous matter secreted by the lactiferous canals.

The microscope, moreover, demonstrates in the milk, scales of epithelium, detached from the mucous membrane which lines the above canals.

These constitute the accidental substances which do not form an essential portion of the secretion now under consideration.

After all, then, in the present point of view, the composition of milk may be compared to that of blood, which is formed of globules suspended in a solution of fibrin, albumen, and salts.

But this comparison, pushed further, would not be sufficiently exact; for, to speak correctly, milk is only a simple emulsion of fatty matter in water, rendered more viscous by the caseum; whilst blood is distinguished by albuminoid corpuscles, endowed with organization.

A decided difference, then, exists between these two animal liquids, which cannot be diminished, even by admitting, with Leuwenhoëck, that a small portion of the caseous matter of milk is there present in the solid state, under the form of globules.

Comparison between the milk and the blood. There is another and a more philosophical manner of examining the composition of milk in relation to that of blood; this consists in looking upon this secretion as a fluid formed entirely at the expense of the latter, which contains its elements ready prepared.

In fact, is it not known that blood contains, under the same forms, all the earthy matters of milk?

In the second place, the caseum is the albumen of the blood, the molecular condition of which is alone changed; and, moreover, caseum has been already discovered in the blood of a great number of animals.

Besides, the presence of fatty matter in the blood, under the form of globules, is now no longer doubtful.

Lastly, the existence of lactic acid has been demonstrated in the blood of those animals whose milk contains lactine.

The milk is, then, derived from the blood, which it resembles in all the principles it contains — earthy matters, *caseum* or *albumen*, fatty matter, and lactic acid; and from which it differs in all those which are wanting—fibrine, colouring matter, &c.

After this comparison, I shall add one word on the condition of the caseum, in the serum of recent milk, filtered so as to separate the globules. This principle is not there present in a state of simple solution, since it appears to be insoluble when it is pure; it is held in solution by means of the soda which the milk contains. In this combination, the caseine plays the part of an acid; but of an acid of such slight intensity, that the base manifests its properties nearly as if it was free, and gives to the milk, especially that of the woman, a decided alkaline reaction.

On the changes which take place in the milk after its extraction. The milk is usually alkaline; it only becomes acid after fermentation has commenced, a portion of the sugar of milk being transformed into lactic acid.

When the quantity of this acid is sufficient, the caseine displaced from its combination separates in the form of curd.

But generally, previous to this, another phenomena is manifested in the milk which is exposed at rest to the air; the oleaginous globules come to the surface and form a layer, of greater or less thickness; and in this state, combined with a certain proportion of caseum, they constitute the matter known under the name of cream.

In cream, the globules of butter, moistened by the liquid portion of milk, are at a certain distance from each other; by churning, their junction is effected; and they coalesce into a compact mass, which constitutes butter, properly so called.

On the variations in the composition of milk. What has just been said, is sufficient to indicate, in a general manner, the composition of milk amongst all the mammalia; but it undergoes modifications according to the species, according to the individuals, and according to circumstances in the same individual.

Moreover, recent experiments lead us to believe, with more probability than ever, in the existence of certain common features which characterize the milk of all animals belonging to the same natural group.

Thus the saccharine matter, which, it may be said, is not absolutely necessary, is only present in animals which live exclusively, or at least in part, on vegetable food; amongst the carnivora, its presence is doubtless supplied by a more abundant fatty matter.

The composition of milk varies, especially in relation to the proportion of its principal constituents. In one species, caseum preponderates, in another, butter, or sugar of milk. Place, for example, the milk of the cow and that of the woman side by side; the first is richer in caseum; the second exceeds it in the proportion of butter and sugar of milk.

The young calf, which has to walk as soon as it is born, sucks a milk which is very suitable for the production of muscle, since it is very much charged with azotised matter; the child, on the contrary, which is not necessitated to test its strength so early, and which, in consequence of this inaction, is deprived of a source of heat—the child, I say, receives a milk which is poorer in caseum, but richer in the combustible substances, butter and sugar.

This hypothesis is perhaps too bold; it is, at present, merely an idea which requires to be verified by observation and experience.

Modifications in the special characters of the proximate principles of the milk also cause its composition to vary.

It is certain that different kinds of butter may be recognized according to the nature of the volatile fatty acid found in them, which is in part free, in part combined, and to which each one owes its peculiar odour. In the cow, &c., it is butyric acid; in the goat, caproic and capric acids. Various sorts of caseine may also be admitted: the caseine of the milk of women, does not react like that of the milk of cows.

On the Milk of Women.

A considerable portion of the history of this species of milk, is implicitly comprised in what has just been stated; a circumstance which justifies us in having devoted so much space to general considerations.

There is probably no kind of milk, observe Deyeux and Parmentier, the properties of which vary so much, as those of the milk of women.

These variations, according to circumstances and to individuals, are even very considerable within the limits of the physiological state, so that it is a difficult matter to define their characteristics in a precise manner.

Physical qualities. The authors above cited, admit in their excellent treatise, three kinds of milk observed in nurses equally robust and in good health: 1st, that which is very serous and semi-transparent; 2nd, that which is very opaque, having the appearance of cow's milk of good quality; and 3rd, milk possessing intermediate qualities, and this was most frequently observed.

The milk is yellowish during the first days of lactation; it afterwards becomes of a more or less opaque white colour.

The odour of women's milk is mawkish, and resembles that of cow's milk.

Its taste is milder and sweeter than that of the latter.

Its specific gravity varies between 1.020 and 1.025, and may even exceed this maximum limit.

In recent researches, at present unpublished, but of which posterity will be proud, MM. Vernois and Becquerel, from eighty-nine analyses of the milk of women, have determined the extreme numbers of its specific gravity to be 1025.16, and 1046.18, which will give a mean of 1032.67.

Their chemical analyses, moreover, furnished the following results on the proportion of the elements of this liquid.

	Minimum.	Maximum.	Mean.
Water	832.30	999.98	889.08
Sugar	35.22	59.55	43.64
Casein and extractive matters	19.32	70.92	39.24
Butter	6.66	56.42	26.66
Salts	0.55	3.38	1.38
Solid constituents	83.33	147.70	110.92

Under the microscope, the particular milk we are examining, like all others, presents itself under the form of a transparent liquid, in the midst of which oleaginous globules float, the characters of which are known; but which, in this instance, present a greater and more uniform size than in the other kinds of milk.

In addition, when more carefully examined, fragments of epithelium may be discovered.

Chemical properties. According to the researches of M. Donné, the milk on its escape from the breast is always alkaline; consequently, it restores the blue colour of litmus paper reddened by an acid; this action is even rather energetic. This character was for a long time misunderstood, in consequence of the mistake into which the earlier chemists fell, who, probably, only experimented upon cow's milk which was not fresh, and already a little acid. The observers who came afterwards—persuaded that the same should be the case with the milk of woman, especially as the presence of free lactic acid was generally admitted in this secretion—contented themselves with placing it in contact with blue litmus paper.

The fact is, that milk, like certain other organic liquids, possesses the singular property of changing the above-mentioned blue colour to red, without being really acid; and this has been considered sufficient to support the assertion that the milk of women possessed an acid character.

Practitioners have also, probably, been deceived by other circumstances, if, for example, they have contented themselves with the application of the test paper to the end of the nipple whilst they pressed the breast; for we know that this part of the organ, being often covered with a layer of dried milk, may possess an acid reaction. The saliva of the child which has just sucked may also be acid in certain cases.

If we lay too much stress on these data, it is with the view of warning practitioners against the error into which they may fall when about to investigate the good or bad qualities of the milk of a nurse.

Left to itself, and at rest, the milk of woman becomes covered with a layer of cream, the thickness of which varies according as we experiment upon one or other of the three varieties of milk above described. It is proportionately thicker as the milk is more opaque, that is to say, more rich in fat globules; sometimes only a thin pellicle is formed. The cream in a thick layer, or, in other words, that formed from the milk the most charged with fatty matter, is tenacious, and alone possesses, according to Deyeux and Parmentier, the property of furnishing a mass of butter by churning. This butter is yellow, consistent, and of an insipid taste.

Meggenhofen has shown that most frequently the milk of woman is not coagulated by hydrochloric and acetic acids. Rennet, on the contrary, always effects its coagulation, and determines the formation of small curds. The real clot is but very rarely observed, because the milk of women is one of the poorest in caseum. Besides, this caseum does not possess, like that of the milk of the cow, a certain facility of being moulded and united in consistent masses; it presents

itself under the form of isolated flocculi, which cannot be made to coalesce.

Let us add, that considering the small proportion of caseum in the milk of women, and, consequently, the less specific gravity of its liquid portion, we may conclude that its cream collects more slowly on the surface than in the milk of the cow, which always serves us for comparison.

Summary of the characteristics of the milk of women. The milk of woman may be distinguished from other kinds by its sweeter taste, by its small proportion of caseum, which is wanting in cohesion, and forms, with acids, soluble compounds; lastly, by its cream, which most frequently does not produce any butter.

This being established, let us proceed to the study of the variations which this kind of milk may present in the physiological and in the abnormal or pathological state.

Physiological Modifications of the Milk of Women.

It is in the accomplishment of the secretory functions that we observe in the highest degree the influence of the primary forces which support life, and which give to it the stamp of individuality in each living being. Thus, supposing the texture of the mammary gland to be identical in different persons, the milk will not be always alike; it may vary every instant under the influence of the most different causes. No two specimens of the milk of women in good health are absolutely alike; and in the same person, the milk may change in composition from one instant to another.

The circumstances which influence the composition of the milk in the normal state, are—1stly, the idiosyncracies; 2ndly, the time that has elapsed since delivery; 3rdly, the interval between the last repast of the infant, or that from the commencement of the repast which is interrupted in order to make the observation; 4thly, the alimentary regimen; 5thly, the genital functions; 6thly, the constitution and the temperament.

Individual idiosyncratic modifications. The differences which the milk presents in nurses who are in the same apparent conditions of vigour and health, have been already pointed out; it is, moreover, well known, that certain women who appear weak, are, notwithstanding, excellent nurses; whilst others, who are very robust, have a scanty and unwholesome milk.

M. Donné mentions the case of a woman whose milk was extremely rich in butter, and presented globules of a very large size.

On the contrary, a certain number of nurses whose milk is poor, constantly present milk globules of very small dimensions.

It must be admitted that there is nothing positively decided on

this point, and I feel certain that the composition of the milk varies according to the vitality and individuality of the mothers, under the influence of the nervous force which animates, directs, and co-ordinates the different operations of the organism; but we are ignorant of the extent of this action on the relative quantities of the elements of the milk, and also on its nutritive qualities, independently of its composition, which is probably different, and which constitute two distinct questions. Nevertheless, some attempts have been made. M.M. Vernois and Becquerel have endeavoured to determine the value of these various influences; and if definite conclusions have not resulted from their investigations on this subject, this assuredly is not the fault of these observers, but must be exclusively referred to the difficulties of the subject, which must be examined from another point of view.

The following analyses of milk of women with breasts more or less developed, and of brown and fair women, may confirm the above remarks; but in order to comprehend their signification, they must be compared with the analysis of normal milk. The means, deduced from a large number of particular analyses, are only given:

	Brunettes.	Blondes.	Slightly developed breasts.	Greatly developed breasts.
Specific gravity	1033.77	1028.88	1032.77	1032.50
Water	892.17	894.20	891.72	888.00
Solid constituents	107.83	105.80	108.28	112.00
Sugar	45.58	44.74	44.29	43.37
Butter	21.53	22.55	25.41	27.17
Caseum	39.27	37.30	37.20	40.08
Salts	1.25	1.21	1.38	1.38

[L'Heretier (*Traité de Chimie Pathologique*, p. 627) selected two females of equal age, and made them submit to the same diet and mode of life. The following are the results of his analyses:

	A blonde, aged 22.		A brunette, aged 22.	
	1.	2.	1.	2.
Water	892.0	881.5	853.3	853.0
Solid constituents	108 0	118.5	146.7	147.0
Butter	35.5	40.5	54.8	56.3
Casein	10.0	9.5	16.2	17.0
Sugar of milk	58.5	64.0	71.2	70.0
Salts	4.0	4.5	4.5	4.5

He appears to have selected the analysis that presented the most marked contrast; for he observes, that if he had taken the mean of all his analyses, the difference between the amount of the solid constituents in the two cases would have been less marked, the average ratio being 120.134.—P.H.B.]

Modifications from the duration of lactation. The milk does not at once arrive at the degree of perfection in which we have previously supposed it; it commences by merely being colostrum slightly modified, from which it borrows the yellow tint, and the elements

of which it retains, gradually getting rid of them in proportion as the period of delivery becomes more distant.

For a few days after delivery, and especially before the establishment of the febrile reaction, known under the name of milk fever, the milk contains, besides its proper elements, albumen, granular bodies, and mucous, either uniting together the globules of butter, or presenting itself under the form of globules. A great inequality in the size of the globules of butter is observed, some of which, according to the happy expression of M. Donnè, are as dust compared to others which are enormous.

It is to the presence of the colostrum that the first milk owes the purgative property which renders it suitable to rid the child of the meconium; but it is probable that we ought, with M. Lassaigne, to attribute this laxative effect to the fatty matter, being more abundant, and at the same time less completely divided.

Nothing is very positively known as to the period at which the milk ceases to be mixed with the colostrum; this term varies according to different circumstances, which it is not easy to appreciate; sometimes the milk has already acquired all its apparent qualities, when the microscope still shows the presence of granular bodies. Before the end of the first month, the milk should have acquired all its characteristics, and, according to Deyeux and Parmentier, the proportion of caseum should always increase, in proportion as the period of delivery becomes more remote.

This proposition does not entirely agree with the results of the analysis of MM. Vernois and Becquerel. According to these experimentalists, it is rather the proportion of sugar which is observed to increase with the age of the milk.

We cannot here misunderstand the final cause which places the food of the child so perfectly in relation with its requirements.

The following is a table, courteously intrusted to me by MM. Vernois and Becquerel, of the analysis of milk at different ages in healthy nurses; it will confirm what has just been observed. The first table represents the modifications of the composition of the milk from one to fifteen days old, and the second, the modifications which take place in the milk from one to twenty-four months old.

HEALTHY NURSES.

TABLE 1.—ON THE INFLUENCE OF THE AGE OF THE MILK ON THE PROPORTION OF ITS ELEMENTS; FROM 1 TO 15 DAYS.

	3 days. 2 cases.	4 days. 2 cases.	5 days. 2 cases.	8 days. 1 case.	9 days. 2 cases.	10 days. 1 case.	11 days. 1 case.	15 days. 2 cases.	From 1 to 5 days. 6 cases.	From 3 to 15 days. 7 cases.
Specific gravity .	1032.23	1032.86	1032.68	1031.35	1031.26	1032.20	1025.61	1032.20	1032.69	1030.33
Water	874.47	869.34	882.45	872.89	882.97	852.30	871.68	870.11	877.20	869.39
Solid constituents	125.53	130.16	117.55	127.11	117.03	147.70	128.32	129.89	122.80	130.61
Sugar	43.13	39.75	38.31	42.02	42.27	48.46	35.54	41.13	40.06	41.69
Butter	33.71	44.44	33.02	38.11	28.29	54.93	56.42	38.50	35.78	41.34
Caseum . . .	47.10	44.18	44.77	44.57	44.47	43.08	32.98	48.66	45.35	45.41
Salts	1.59	1.79	1.45	2.41	2.00	1.23	3.38	1.60	1.61	2.17

TABLE 2.—ON THE INFLUENCE OF THE AGE OF THE MILK ON THE PROPORTION OF ITS ELEMENTS; FROM 1 TO 24 MONTHS.

	From 1 day to 1 month. 13 cases.	From 1 to 2 months. 2 cases.	From 2 to 3 months. 4 cases.	From 3 to 4 months. 7 cases.	From 4 to 5 months. 7 cases.	From 5 to 6 months. 9 cases.	From 6 to 7 months. 9 cases.	From 7 to 8 months. 5 cases.	From 8 to 9 months. 4 cases.	From 9 to 10 months. 3 cases.	From 10 to 11 months. 7 cases.	From 11 to 12 months. 7 cases.	From 12 to 18 months. 12 cases.	From 18 to 24 months. 1 case.
Specific gravity .	1031.69	1033.11	1032.70	1032.90	1032.10	1034.35	1034.97	1031.37	1032.88	1031.44	1031.61	1030.68	1032.50	1030.81
Water	872.84	872.99	886.16	889.67	888.25	901.51	891.35	889.49	891.65	889.28	900.63	889.04	891.34	876.55
Solid constituents	127.16	127.01	113.84	110.33	111.75	98.49	108.65	110.51	108.35	110.72	99.37	110.96	108.66	123.45
Sugar	40.40	43.13	43.37	44.47	44.66	42.00	44.18	41.52	45.31	45.84	47.62	43.91	43.92	41.33
Butter	39.55	34.05	31.22	27.79	27.31	16.57	24.35	22.79	23.06	25.03	19.47	24.61	24.44	43.47
Caseum	45.38	48.26	37.92	36.96	38.28	38.63	38.86	45.02	38.79	38.57	31.06	41.06	36.98	37.32
Salts	1.83	1.57	1.33	1.11	1.50	1.29	1.26	1.18	1.19	1.28	1.22	1.38	1.32	1.33

[Simon (on *Animal Chemistry*, Sydenham Society's translation, vol. 2, p. 56) analysed the milk of a woman during a period of nearly six months, commencing with the second day after delivery, and repeating the observations at intervals of eight or ten days.

The fourteen analyses gave the following results:

	Specific gravity.	Water.	Solid constituents.	Casein.	Sugar.	Butter.	Fixed salts.
Aug. 31	1031.6	873.2	126.8	21.2	62.4	34.6	0.84
Sept. 7	1030.0	883.8	116.2	19.6	57.6	31.4	1.66
Sept. 8	1030.0	899.0	101.0	25.7	52.3	18.0	2.00
Sept. 14	1030.0	883.6	116.4	22.0	52.0	26.4	1.78
Oct. 27	1034.0	898.2	101.8	43.0	45.0	14.0	2.74
Nov. 3	1032.0	886.0	114.0	45.2	39.2	27.4	2.87
Nov. 11	1034.5	914.0	86.0	35.3	39.5	8.0	2.40
Nov. 18	1033.0	880.6	119.4	37.0	45.4	34.0	2.50
Nov. 25	1033.4	890.4	109.6	38.5	47.5	19.0	2.70
Dec. 1	1032.0	902.0	98.0	39.0	49.0	8.0	2.08
Dec. 8	1033.0	890.0	110.0	41.0	43.0	22.0	2.76
Dec. 16	1034.4	891.0	109.0	42.0	44.0	20.0	2.68
Dec. 31	1034 0	861.4	138.6	31.0	52.0	54.0	2.35
Jan. 4	1032.0	873.6	126.4	40.0	46.0	37.0	2.70

A glance at the three columns of casein, sugar, and butter, will show with few exceptions, 1stly, that the quantity of casein is at its minimum at the commencement, it then rises considerably, and ultimately attains a nearly fixed proportion; 2ndly, that the quantity of sugar is at its maximum at the commencement, and subsequently diminishes; and 3rdly, that the butter is a very variable constituent of the milk.

The variations observed in the column of the sugar and of the casein, arise, in all probability, from those disturbances of the mode of living, and of the tranquillity of the mind, which produce a decided influence on the composition of the milk, and over which the experimentalist can exert no control.—P.H.B.]

Modifications from sojourn in the breasts. Observation on this point teaches us as follows: explanations will be given afterwards:

1. That in the same experiment, the milk is the richer in proportion as it has been drawn later; the poorest is that which comes first.

2. That the milk is the more serous in proportion as more time elapses between two consecutive experiments.

Thus, contrary to all that is known of the other fluid secretions, the milk becomes more and more aqueous in proportion as its retention in the breasts is prolonged; the more solid ingredients are absorbed first.

Numerous analyses were, at least, necessary to confirm this paradoxical result, announced by M. Péligot in his memoir on asses milk; a result, moreover, which partly contradicted the experiments of Deyeux and Parmentier, who have informed us that the milk of a cow is less abundant, and more rich in butter, when it is only drawn once in twenty-four hours.

Nevertheless, we should in some measure cease to be surprised when we reflect on the nature and uses of milk, which are very different from those of the other secretions.

In fact, the uses of milk are only casual, and the secretion only

takes place when it happens that the organ destined to accomplish it continually receives a fresh stimulus; it forms part of the plan of nature to dry up the lacteal secretion as soon as it becomes useless.

For when the young animal no longer exercises the usual suction, or rather, when no artificial stimulus is made use of, the milk becomes useless; not only is this henceforth the case, but even that which distended the breast at the time of the last flow quickly disappears.

Such is not the case with the other secretions, such as the urine and the bile, for while their uses commence with life, they can only terminate with existence itself.

Moreover, it would not be a matter of indifference if the principles of the urine or of the bile were taken back into the blood as rapidly as those of the milk; the nature of the latter approaches so closely to that of the blood itself, that its reabsorption could not occasion any disturbance in the economy; on the contrary, its caseum might be converted into fibrine; and its fatty matter, as well as its sugar of milk, into combustible material, as happens with the analogous principles of blood.

[L'Heretier has investigated the changes produced in the milk by a prolonged sojourn in the breast. The two following analyses illustrate the effect thus produced. The milk in each analysis was afforded by the same woman. In the first case, it had remained in the breast for forty hours; in the second, it was obtained after the infant had been sucking for some little time:

Water	901.1	858.0
Solid residue	98.9	142.0
Butter	34.0	36.5
Casein	1.9	13.0
Sugar of milk	58.5	78.0
Salts	4.5	4.5—P.H.B.]

4.—*Modifications from alimentary regimen.* The milk of woman is slightly modified as to the quantity of its solid materials by an insufficient nourishment. This diminution almost exclusively affects the specific gravity, and the quantity of butter and caseum. Thus MM. Vernois and Becquerel, who have looked upon this question in the most varied points of view, and who have made special analyses with reference to it, have arrived at the following means:

	Food of good quality.	Food of medium quality.
Specific gravity	1034.68	1031.91
Water	888.86	891.80
Solid constituents	111.14	108.20
Sugar	42.97	43.88
Butter	26.88	25.92
Caseum	39.96	36.88
Salts	1.33	1.52

[Simon (*Op. Cit.*, p. 55) analysed the milk of a very poor woman fifteen times, at regular intervals, during the course of half a year, commencing with the second day after delivery. It so happened that she was suddenly deprived of the means of

obtaining the most ordinary necessaries of life. The milk secreted at this period (Nov. 11) was sufficiently abundant in quantity, but was very poor in solid constituents, containing only 8.6. Some days afterwards (Nov. 18) she was placed upon a full and nutritious meat diet. The milk, in consequence, was secreted so copiously as to run spontaneously from the breasts: it left 11.9 of solid constituents. Her circumstances again became very bad, and she was frequently in a state of the utmost destitution. On the 1st of December, while in this condition, the milk again became very thin, and left only 9.8 of solid constituents. He concluded his researches on the milk of this woman, by an examination on January 4th, after she had been supplied for two days with a nutritous meat diet: the milk was then very rich in solid constituents, and left a residue of 12.6.

The following are the results of the examinations on these four occasions; below them is the average of the fourteen analyses already referred to:

	Water.	Solid constituents.	Butter.	Casein.	Sugar and extractive matter.
1. Milk on Nov. 11 . .	914.0	86.0	8.0	35.5	39.5
2. Ditto Nov. 18 . .	880.6	119.4	34.0	37.5	45.4
3. Ditto Dec. 1 . .	920.0	98.0	8.0	39.0	49.0
4. Ditto Jan. 4 . .	873.6	126.4	37.0	40.0	46.0
5. Average of 14 analyses	883.6	116.4	25.3	38.3	48.2

It is evident from these analyses, that however much the nutriment of the mother may vary, no great influence is thereby exerted on the relative quantities of casein and sugar. The changes consist in a greater or less degree of saturation, in the rich yellowish white or the bluish colour, in the quantity of the milk, and in its amount of solid constituents. With the exception of the variation in quantity, all the other changes are dependent on an increase or diminution of the butter; the former occurs under the use of a copious and nutritious diet, the latter when the food is poor and scanty.—P.H.B.]

M. Péligot, in his memoir previously mentioned, observes that nourishment possesses an influence over the solid constituents of the principles of the milk; he was led to the conclusion, that as regards asses at least, beetroot give the richest milk; then come lucerne and wheat, mixed; and, lastly, carrots.

MM. Boussingault and Lebel, in the work which they have published relating to the influence of the nourishment of cows on the quantity and the chemical constitution of the milk, thus express themselves:

"Finally, this investigation enables us to state that the nature of the aliments consumed does not exercise a very marked influence on the quantity and chemical composition of the milk (we do not say on its quality), if the cows receive nourishment equivalent to these various kinds of food."

We may, however, remark, that certain matters pass into the milk, and that others are developed therein, under the influence of a determinate nourishment. These facts will be more properly referred to in another chapter.

5.—*Modifications from the genital functions.* After the return of the catamenia in a mother who suckles her infant, and during her menstruation, the lacteal secretion is less abundant, and the milk

is slightly altered in its composition. Up to the present time it was believed that this liquid became more serous under this influence. This error has been corrected by the researches of MM. Vernois and Becquerel. The milk, on the contrary, becomes more dense and richer in solid constituents, which may render it injurious to children, as attentive observation will prove.

	Suspension of the catamenia.	Reappearance of the catamenia.	Actual presence of the catamenia.
Specific gravity . .	1032.24	1031.94	1031.98
Water	889.51	886.44	881.42
Solid constituents . .	110.49	113.56	118.58
Sugar	43.88	41.68	40.49
Butter	26.54	26.98	29.15
Caseum	38.69	43.58	47.49
Salts	1.38	1.32	1.45

[So great is the difficulty of obtaining true statements upon this point, that among the great number of hired nurses in Paris, M.M. Becquerel and Vernois have only been able to examine the condition of the milk in three women while actually menstruating. In these, as the above analyses will show, the density of the fluid was found slightly diminished, as was the proportion of sugar, and the proportion of water was sensibly so. The solid parts were notably increased, especially the caseum. The authors cannot believe that such changes in composition can induce any mischief beyond some temporary derangement in the digestive organs, and even this might be prevented, by causing the child to suck less, and letting it drink a little sugar and water, to replace the sugar and water lost during menstruation.

M. Roger, while attached to the office for nurses, paid considerable attention to this point, and arrived at the following conclusions: If the menses reappear easily, without pain or derangement of the nurse's health, while her milk is under twelve or fifteen months old, and the quantity of blood lost is normal and moderate, the quantity of milk does not become diminished, or its qualities altered, and the child does not suffer from its use. If, however, the menses are too abundant, or too frequent, the milk may diminish in quantity, or disappear. The same effect is also produced, though more slowly, in some days or weeks, when the menses are prolonged for a week, so that the loss is considerable. The milk will much more certainly dry up if the menses reappear at an advanced period of lactation; this being then the signal of the imperfection and approaching termination of the secretion.

When the milk becomes thus diminished, it rarely exhibits the physical characters of poor milk; but by its density, whiteness, and the access in number and size of its globules, it more approaches in character and richness cow's milk. When the menstrual epochs reappear with difficulty, and are attended with pain, indigestion, and diarrhœa, &c., or are preceded or followed by leucorrhœa, the child may suffer symptoms due to indigestion, induced by the altered characters of the milk. The alteration of the milk chiefly consisting in increase in the number and size of the globules. These influences are, however, only temporary, and the milk soon recovers its normal character. The ailments which the child hence suffers are only temporary, and have been greatly exaggerated.—*L'Union Medicale*, 70.—P.H.B.]

Pregnancy generally dries up or alters the secretion of milk, which shows a tendency to pass again into the state of colostrum.

Nothing positive is known concerning the influence exercised by coitus.

Previous pregnancies have a marked influence on the qualities of the milk; women who have already had children (one or two, for example) make better nurses than primiparæ; their milk is both more abundant and more rich; on the contrary, it becomes impoverished after too frequent pregnancies.

The following is the table of means furnished by the analyses of MM. Vernois and Becquerel, and, as will be perceived, the result of the analyses confirm my assertion:

	Primiparous state.	Multiparous state.
Specific gravity	1031.84	1032.30
Water	889.35	885.53
Solid constituents	110.65	114.47
Sugar	44.14	46.82
Butter	25.66	27.01
Caseum	39.46	39.27
Salts	1.39	1.37

Modifications from constitution, temperament, and age. All that is known on this subject may be reduced to the statement that the most robust nurses are generally preferable to the more delicate ones, and that women of a lymphatic temperament possess more abundant milk than women of a sanguine, or bilio-sanguine temperament. As regards age, well-developed women, neither too young nor too old, have the best milk.

I subjoin a table by MM. Becquerel and Vernois, from which we may learn the influence of the constitution of nurses on the composition of the milk. It is a curious fact that the women noted as being of a feeble constitution, present the richest milk, and one which approaches closer to milk in its normal state.

	Strong constitution.	Feeble constitution.
Specific gravity	1032.97	1031.90
Water	911.19	887.59
Solid constituents	88.81	112.41
Sugar	32.55	42.88
Butter	25.96	28.78
Caseum	28.98	39.21
Salts	1.32	1.54

The following table exemplifies the influence of age, and suggests the preference that should be given to nurses from twenty to thirty-five years:

	From 15 to 20 years.	20 to 25.	25 to 30.	30 to 35.	35 to 40.
Specific gravity	1032.24	1033.08	1032.20	1032.42	1032.74
Water	869.85	886.91	892.96	888.06	894.94
Solid constituents	130.15	113.09	107.04	111.94	105.06
Sugar	35.23	44.72	45.77	39.53	39.60
Butter	37.38	28.21	23.48	28.64	22.33
Caseum	55.74	38.73	36.53	42.33	42.07
Salts	1.80	1.43	1.26	1.44	1.06

From all these analyses, which represent so many means deduced from particular observations, and also from many others which I am unable to bring forward, it results that in the physiological state of the nurse, the milk is more or less modified as to the proportion of its elements, without departing much from the limits fixed by normal means. Still, by the comparison of the different analyses, and by the aid of a little reflection, we may deduce certain propositions which constitute so many laws as to the relative changes in the elements of milk in comparison with each other. This MM. Vernois and Becquerel have very judiciously accomplished. Thus—

"When the quantity of the elements of the milk is raised, the increase principally affects the water, the sugar, and the caseum.

"When, on the contrary, the quantity of the elements is lowered, the diminution principally affects the salts and the butter.

"When the sugar or the salts increase or diminish, the specific gravity does not vary.

"When the butter and the water increase, the specific gravity is lowered; and when these two elements diminish, it becomes materially raised.

The increase in the quantity of the caseum also increases the specific gravity; its diminution makes it vary but little.

"When the whole quantity of the solid constituents of the milk increases comparatively to the quantity of water, the specific gravity is increased.

"Whenever the four solid constituent elements of the milk have increased in proportion, the water has diminished in quantity; and vice versâ."

The elements of the milk are not mutually combined together, and there exists no constant and regular proportion, as to the quantity in which they are produced. The element in which the greatest increase is evinced should be ascertained, and so with the other elements, in order to establish the degree of relative importance attached to each element.

Hitherto no one has been able, either from the study of the specific gravity, or from that of the butter — which has been attempted by means of the lactoscope, and of the microscope — to give a correct idea of the richness of the milk. These means enable us to state if the milk contains little or much water—if it contains more or less butter, and that is all. MM. Becquerel and Vernois have succeeded much better; they have demonstrated, by experience, that the quantitative analysis of the elements of milk can alone enable us to appreciate its qualities.

Modifications of the Milk from pathological causes.

Various moral and pathological circumstances may act on the lacteal

secretion as they act on all other secretions; the milk may be rapidly changed in quantity and in the proportion of each of its constituent principles; hence result different degrees of general abundance, or of the richness and poverty in this secretion.

Three kinds of influences exercise a very decided action on the quantity and on the proportion of the elements of the milk. These are, 1stly, those of substances introduced accidentally or with food into the stomach; 2ndly, those of the moral affections; 3rdly, those of diseases, properly so called.

Changes effected by medicinal or other substances.

Some kinds of colouring matter, such as madder, pass into the milk, another appears to become developed there in some of the ruminantia: I refer to the blue matter, analogous to indigo in its physical and chemical qualities, which sometimes forms a layer on the milk of cows or of sheep whose constitution is disposed thereto, and which have been fed on saint-foin.

The bitter principles of wormwood, the odorous principles of garlic of thyme, the purgative principles of hyssop, pass into the milk.

But what concerns us most is, to discover if medicinal substances pass into the milk, and may thus be transmitted from the mother to the child.

M. Péligot, in his experiments upon asses, has detected the iodide of potassium in their milk, after the sixth day of administration; he has also discovered therein chloride of sodium and other salts.

[Simon (*Op. Cit.*, p. 60) has sought in vain for ferrocyanide of potassium in the milk of women who were suckling, and to whom he had given it in doses of six drachms. After the lapse of two days, twenty-three grains of the iodide of potassium were given to the same woman, but no traces of this salt could be detected in the milk. Simon also attempted in vain to detect sulphate of magnesia in the milk of a woman who was suckling, and to whom he had administered it in a sufficient dose to act as a laxative.

Herberger has detected iodide of potassium in the milk of women. Day has, on several occasions, observed the ordinary indication of iodine on the addition of zyloidin, or of starch, and a drop or two of nitric acid, to the urine of infants at the breast, during the period of the mother taking three grains of iodide of potassium thrice a day—a convincing proof that the salt had entered the milk. There can be no reasonable doubt that mercurial preparations do enter the milk, although they have never been detected there. The effects of mercurial preparations in infants when administered to the mother are undoubted, and the salutary effect of the milk of animals to which this agent has been given.—M. A. Lebreton, *Journ. des Connoisseurs Medico Chirurg.*, tom. iv., p. 200. Orfila believes that by acting on a sufficient quantity, and making use of the most delicate process, mercury may be discovered.—P.H.B.]

Changes produced by moral affections.

Facts tending to demonstrate the fatal influence which fright, anger, or nervous attacks exert on the quality and quantity of the milk are

everywhere to be found, but we are completely ignorant of the kind of change which this secretion undergoes in such circumstances—changes often sufficiently powerful to cause the immediate death of the nursling, of which an example has been cited.

It is the same with the mammary gland as with the lachrymal and some other glandular organs situated on the surface of the body; it is intimately connected with the energy and agitations of moral life.

When the mother experiences violent moral emotions, the child which she is suckling is restless, ill at ease, and is sometimes seized with convulsions. This unfortunate accident may be prevented by drawing the milk contained in the breast at the time of the moral impulse, and allowing the child to suck only when the mother has recovered her former tranquillity.

[The influence of mental emotion on the milk cannot be better illustrated than by the following case, related by Tourtual (*Praktische Beihräge zur Therapie der Kinder-Krankheiten, Münster*): "During Easter, 1821, a carpenter of this place (Munster) quarrelled with a soldier, who was billetted on him, when the latter fell upon him with his drawn sword. The carpenter's wife, at first, trembled with fear and horror; then, suddenly throwing herself between the combatants, she wrested the sword out of the soldier's hand, broke it, and flung it away. Some neighbours, attracted by the noise, hastened to the spot, and separated the men. The mother, while thus violently excited, and while this mad uproar still continued, took up her child from the cradle where it was playing, and gave it the breast. The infant was in perfect health, and had never had a moment's illness. After some minutes it became restless, and left off sucking; it panted and sank dead in its mother's lap. A quarter of an hour had scarcely elapsed when I saw the child. It was as though sleeping undisturbed in its cradle, and the body had not yet lost its natural heat. I applied immediately all the resources of my art (although I could not understand how death could take place so rapidly from such a cause), but in vain." Broadhurst (*Medical Times*, p. 106, 1854) relates the following case: "E. B., aged seventeen, when a child of nine months' old, her mother, who was still suckling her, received the unexpected intelligence of the death of her father at sea, and was naturally much affected on hearing the report. A few days later, she was alarmed by her child shuddering and fainting in her arms, without any apparent cause. The attacks were repeated, returning at short intervals, and terminated in convulsions; the toes were drawn downwards and the feet inwards, and the hands were clenched. At two years of age these fits became less frequent, and assumed the ordinary character of epileptic attacks. The extensors and adductors of the feet, and the flexors of the fingers, were slightly but permanently retracted.

"So many instances are now on record in which children that have been suckled a few minutes after the mothers have been in a state of violent rage or terror, have died suddenly in convulsive attacks, that the occurrence can scarcely be set down as a mere coincidence; and certain as we are of the deleterious effects of less severe emotions upon the properties of the milk, it does not seem unlikely that in these cases the bland nutritious fluid should be converted into a poison of rapid and deadly operation."—CARPENTER (*Manual of Physiology*, 2nd edit., p. 509).—P.H.B.]

Thus Parmentier and Deyeux relate that in a woman, when labouring

under nervous attacks, the milk became in less than two hours almost transparent, and, moreover, viscid like the white of an egg, and resumed its natural qualities only after the cessation of the attacks.

In a case of this kind, MM. Becquerel and Vernois managed to collect the milk and analyse it.

Specific gravity	1032.99
Water	908.93
Solid constituents	91.07
Sugar	34.92
Caseum	50.00
Butter	5.14
Salts	1.01

This diminution in the solid constituents of milk, and especially of butter, together with the increase in the amount of water, is a very curious fact, and one worthy of the greatest attention.

It is, moreover, known, and Burdach* assures us, that cows give less milk when they are milked by an unknown hand. According to Schubler, they do not furnish any when they have been ill-treated by the milker, or when they are surrounded by a great number of strangers. As there is no muscular apparatus in the breast, this diminution in the flow of milk cannot be attributed to it. It is entirely an involuntary effect, which depends at first on the repugnance of the animal causing the blood to flow in less quantity into the mammary glands, which become less active, and afterwards on a sort of closure of the excretory orifices by the erectile tissue which surrounds them.

It is also a fact that the sight of the nursling, the idea of seeing it at the breast, and the joy which certain mothers thence experience, exercise a moral influence over the secretion of the milk entirely independent of their will. They feel the draught of milk as soon as they behold their child, or if they think of it too deeply; and in a woman who saw her child fall to the ground, the flow of milk ceased, and did not reappear until the child, having quite recovered, attempted to take the breast.

Change caused by diseases properly so called.

That the lacteal secretion becomes altered by disease is incontestable, but until the present time the nature of this change was not known. M. Donné has described those only which may be observed by means of the microscope, in two morbid conditions, viz., those of congestion and abscess of the breast. The results published by this physician will be presently stated. In the other diseases of the nurse (and they are numerous) the modifications in the composition of the milk have been but slightly investigated. MM. Vernois and Becquerel have progressed in this new and promising path; they have analysed the milk of forty-

* *Traité de Physiologie;* Paris, 1839; t. iv, p. 397.

five nurses affected with different acute or chronic diseases, and it will be observed that conclusions full of interest have been the result.

Generally it may be stated that in all acute diseases the quantity of milk is very much diminished. Indeed, if the fever is very acute, the secretion becomes completely dried up.

By optical analysis, M. Donné has discovered that in congestion of the breast the milk resumes the characters of the colostrum. Granular bodies are also observed in it, and aggregations of globules united by mucous.

In abscesses of the breast, which involve the glandular tissue itself, as well as in sub-mammary abscesses opening in front, or in mammary abscesses properly so called, globules of pus, recognizable by their roughened outline, &c., are observed.

By means of chemical analysis, it is observed that in diseases, whatever their nature may be, the proportion of the solid constituents increases at the same time that the proportion of water diminishes. From the analysis recorded below, the fact appears more decided in chronic diseases than in acute febrile disorders. But this increase of the amount of the solid constituent principles of the milk constitutes a serious alteration, which frequently produces indigestion and consecutive attacks of enteritis in the child.

In twenty-seven cases in which the milk of nurses labouring under chronic diseases was analysed, MM. Vernois and Becquerel arrived at the following results:

	Mean.	Maximum.	Minimum.
Specific gravity	1030.81	1034.32	1027.07
Water	879.89	923.58	832.96
Solid constituents	120.11	167.04	89.51
Sugar	46.16	57.98	30.38
Caseum	35.50	47.49	12.70
Butter	36.71	73.05	6.90
Salts	1.74	3.38	0.61

On the other hand, in eighteen cases of acute febrile disease:

	Mean.	Maximum.	Minimum.
Specific gravity	1031.20	1035.28	1025.57
Water	844.91	911.35	869.22
Solid constituents	119.09	130.78	88.65
Sugar	33.10	48.71	19.50
Caseum	50.40	66.26	34.62
Butter	29.86	56.37	5.14
Salts	1.73	6.95	0.67

In addition, the following is a table in which each of the diseases mentioned above is given more in detail, with the means for each particular disease.

DISEASED NURSES.

SUMMARY OF THE INFLUENCE OF CHRONIC DISEASES IN PARTICULAR ON THE COMPOSITION OF THE MILK.

	Chronic opthalmia.	Chronic pleurisy.	Chronic enteritis.	Low diet for seven days.	Chronic bronchitis.	Chronic metro-vaginitis.	Hœmop-tysis, pulmonary tubercles.	Pulmonary tubercles, without diarrhœa or emaciation.	Pulmonary tubercles, with diarrhœa and emaciation.	Abscess of the breast.	Syphilis.	Syphilis, without mercurial treatment.	Syphilis, with mercurial treatment.
Specific gravity .	1031.30	1032.74	1032.28	1027.07	1032.40	1030.81	1031.41	1031.84	1031.38	1031.22	1029.79	1028.89	1030.24
Water	882.13	892.84	861.34	885.17	887.77	878.35	892.53	876.59	903.16	887.08	866.39	850.41	874.05
Solid constituents .	117.86	107.16	138.66	114.83	112.23	121.65	107.47	123.41	96.84	112.92	133.61	149.59	125.95
Sugar	46.29	45.26	50.25	30.38	47.05	42.25	42.93	42.14	43.45	41.72	52.32	56.34	50.32
Caseum	37.05	36.46	39.19	46.13	39.89	25.21	38.46	37.46	39.14	35.89	32.14	33.82	31.30
Butter	32.82	24.25	48.53	37.28	23.83	51.98	24.39	41.82	12.76	34.23	46.73	57.04	41.89
Salts	1.70	1.19	0.89	1.04	1.46	2.21	1.69	1.99	1.49	1.08	2.42	2.39	2.44

SUMMARY OF THE INFLUENCE OF SOME ACUTE FEBRILE DISEASES IN PARTICULAR.

	Acute enteritis.	Acute pleurisy.	Very acute colic.	Great moral emotion, with fever.	General indis-position. Weariness, fever.	Acute metro-vaginitis.	Acute metro-peritonitis.
Specific gravity .	1030.68	1033.98	1025.57	1032.99	1032.44	1033.40	1030.30
Water	883.22	888.95	869.60	908.93	880.32	884.70	885.09
Solid constituents .	116.78	111.05	130.40	91.07	119.68	115.30	114.91
Sugar	33.21	32.94	32.02	34.92	32.14	40.00	30.07
Caseum	50.30	49.55	42.86	50.00	47.70	56.71	48.33
Butter	31.53	27.77	54.12	5.14	32.89	17.12	35.03
Salts	1.74	0.79	1.40	1.01	0.95	1.47	1.48

The quantity of this liquid may also be estimated by the sensation experienced by the nurse at the moment of lactation. This sensation is known under the name of the *draught* of milk. In fact, women, whose milk is very abundant, feel it ascend in proportion as the child sucks; their breasts become distended, and it flows away in abundance from the breast which is unoccupied.

We shall conclude this study of woman's milk by some practical considerations, which closely result from what has been just stated. Supposing the choice of a nurse is about to be made, the information we have now acquired will be of the greatest service. In order to be perfect, she should fulfil the following conditions: 1, she should be in good health; 2, of a robust constitution, and of a bilio-sanguine or lymphatico-sanguine temperament; 3, she should be a mother for the second time at least; 4, from twenty to twenty-five years of age; 5, she should have been confined at nearly the same period as the birth of the nursling about to be confided to her. When these conditions are fulfilled, the milk cannot fail to be suitable; but it may be equally good although some of these conditions may be wanting; so that, without neglecting the examination of the nurse, the characters of her milk should often be studied before passing a final judgment.

Here the question presents itself: by what signs, and by what means, may we recognize the quantity and the qualities of the milk?

It is a difficult matter to measure the quantity of the milk of a nurse. It may be approximably obtained by the observation of the child which sucks. If it makes considerable efforts, if it often seeks the breast, it is in consequence of the milk being in insufficient quantity. If the repasts are soon finished, and if it is contented with making only a small number of them in a day, and especially if the milk trickles from its lips, then it is abundant. The approximation can be obtained in a still more definite manner, by the method of M. Natalis Guillot, who weighs the child before and after being put to the breast. The difference in weight indicates the quantity of milk swallowed. Each time it is nursed it should draw from one ounce and a half to five or seven ounces and a half from the breast; but any quantity of milk below one ounce and a half is insufficient for the requirements of nutrition.

There are two methods of appreciating the qualities of the milk, optical or chemical analysis, which enable us to ascertain the proportions of the elements of this liquid.

By means of optical analysis, the richness and the perfect elaboration of the milk may be determined; that is to say, the quantity of globules or of cream which it contains, and, further, the greater or less size under which the fatty matter presents itself.

The study of the globules is very much facilitated by the microscope.

Their number is in relation with the richness and the nutritive qualities of the milk. The more globules it contains, the more substantial is this liquid; the caseum and the sugar being often in proportion to the quality of the milk globules, which represent the fatty or butyraceous portion. Too many or too few globules is an equally unfortunate circumstance.

The size of the globules is of the greatest importance.

When the microscope presents to us very small globules, or globular dust so to speak, it is to be presumed that the milk is imperfectly elaborated; when it shows us globules of too large a size, the milk is indigestible.

The richness of the milk may be further determined by various means. The appearance alone may give us a general idea of it: thus the milk is so much the more suitable as it is more opaque and dull.

The microscope will afford a rather more precise idea of the volume and of the quantity of the globules.

Lastly, two instruments have been proposed in order to measure, with more or less exactness, the richness of the milk; understanding, by this term, only the proportion of butter it contains, a proportion which, moreover, does not invariably follow that of the caseum.

One of these instruments, called the *lactometer*, has been invented to measure the thickness of the layer of cream. It is founded on the fact, that when milk is left to itself it becomes separated into two layers, the upper of which, due to the aggregation of the milk globules, constitutes cream; now the quantity of cream represents the richness of the milk, at least as regards the fatty matters. The lactometer consists of a tube divided into 100 parts; after having filled it with milk and allowed it to rest twenty-four hours, in order that the separation may be complete, the number of degrees occupied by the cream is noted. Milk of good quality contains about three parts of cream in 100.

Another and a more correct method is that of M. Donné, and bears the name of *lactoscope;* it measures the opacity of the milk, which, is known to be proportional to the quantity of butter or cream.

"The lactoscope consists of an eye piece, composed of two concentric tubes, fixed one upon the other by a screw. Each tube bears a flat glass; the two glasses may, by means of a turn of the screw, be brought into perfect contact. The relative position of the tube is indicated at this instant by the coincidence of a zero placed upon one of them, opposite a small arrow engraved on the other; the space generated between the glasses, in proportion as the tubes are unscrewed, is indicated by a division traced on the circumference of the internal tube. As the inclination of the screw is very slight, it will be understood that the division marked on the circumference will readily permit the appreciation of the quantities, however small; since, for example, this circumference,

divided into fifty portions, will give the means of dividing by 1.50 the space engendered at each turn of the screw of one-half millimeter of separation.

"It is in the space comprised between the two glasses, and which may be altered at will, that the milk which it is desired to investigate is poured. A sufficient quantity must be introduced to prevent the light of a candle placed at a distance of three feet from being seen. The instrument, thus charged, is to be interposed between the eye of the observer and the light. Then by progressively diminishing the layer of milk, by gently screwing one tube on the other, and thus separating the glasses, a certain thickness is obtained, through which the image of the flame begins to dawn; this is the time to stop. The reading of the position of the division in relation with the indicatory arrow will give the thickness of the layer at this moment. By separating, by means of the screw, these tubes several times in succession, so as to restore the opacity to the layer of milk, and bringing them again to the point at which the image begins to appear; if every time the same relation is observed between the division and the indicatory arrow, one may be assured of the correctness of these means of observation."*

This instrument is, in reality, a very ingenious one, and enables us to determine with facility the richness of the cream in the milk of a nurse. It is the best means to employ for this purpose, for it is impossible to arrive at any positive result by boiling the milk in a spoon, and observing the transparency through a drop of this liquid placed on the nail, &c., as was formerly done.

A small quantity of the milk to be examined is sufficient when introduced into the instrument. A thin layer of this liquid is sufficient to eclipse the light of the candle when the quantity of cream is considerable. On the contrary, a thicker layer is necessary when the milk is watery, impoverished, and only contains a small quantity of cream.

If the instrument be well graduated, as the degree of the separation of the glasses for a good ordinary milk is under the eye, this figure serves as a comparison for the different kinds of milk concerning which we may have to give an opinion.

If, on the contrary, chemical analysis is to be employed to determine the exact proportions of the various elements of milk, the method of proceeding adopted by MM. Becquerel and Vernois should be used, and this will be concisely related.

From one ounce and a half to two ounces of milk is to be taken, and this is to be divided into three portions, one of two to three drachms, the two others of from five to six drachms.

The first portion, that of two to three drachms, is placed in a flask

* Extract from the Report of the Academy of Sciences on the Memoir of M. Donné. *Cours de Microscopie*; Paris, 1844; pp. 534 *et suiv.*

for the determination of the specific gravity, and by means of the well known methods of proceeding, the specific gravity of the milk as compared with that of distilled water at a given temperature is readily ascertained. When only a small quantity of milk is at our disposal, the determination of the specific gravity, being of less importance than the other results, may be neglected.

The second portion of the milk, from five to six drachms, is destined to furnish the quantity of the sugar, the weight of the extractive matters, and salts. In order to obtain the weight of sugar, these five or six drachms of milk are treated by five or six drops of rennet and four or five drops of acetic acid. It is beaten up with a spatula, and the whole is exposed in a platinum capsule to a temperature of 120° to 140° Fah., and then placed upon a filter. In this operation, which must be rapidly accomplished, the caseum becomes coagulated, taking with it the fatty matter, and filtering allows the serum to pass perfectly clear and limpid. Sometimes a second filtration is necessary, or two or three hours rest, so as this clearness may be perfect. This serum is placed in a polarizing apparatus. The deviation to the right is determined, and, by means of a table drawn up for this purpose, the quantity of sugar of milk contained in 1000 parts of milk, for example, is exactly obtained. To determine the weight of the extractive matters and soluble salts, the serum is evaporated, the dry residue weighed, and the difference between the weight of the sugar and the total weight of the dried serum gives the quantity of extractive matters sought for. This latter valuation is not, however, so exact as that of the sugar, but it is sufficient.

The third portion of the milk which has been put aside, and which amounts to five or six drachms, is weighed in its liquid state, then dried at a temperature of 158° to 177° Fah. for a very considerable time; the weight of the dried product is then ascertained, this product is treated by ether, which removes all the greasy matter; it is filtered, and then again dried and weighed. The product is the amount of caseum, of sugar, and of extractive matters. The difference with the first weight expresses the quantity of butter. The whole is reduced to 1000 parts. We have then separately, 1, the quantity of sugar; 2, of extractive matters; 3, of caseum. If these three weights are added together, and from this sum the weight furnished by the product of the dried milk is subtracted, the difference gives the quantity of caseum. The analysis of the milk is then complete, and, as we have observed, by reducing all the results to 1000 grains, we have, 1, the specific gravity of the milk; 2, the water; 3, the butter; 4, the sugar; 5, the soluble extractive matters; 6, the caseum. Incineration will furnish the absolute weight of the salts.

In a word, then, as we have just seen, the choice of the nurse rests upon the determination of a great number of very variable circumstances;

1, on the actual or former state of the health of the woman; 2, on their appearance; 3, on their character; 4, on the age and composition of their milk—a composition which is readily determined by the microscope, and by the two instruments referred to; and, 5, by means of an exact analysis of its various constituent elements.

Of Nurses in general.

There are two kinds of nurses: those who take the children from Paris to rear them in the country, and those who are admitted into a family, there to suckle the child confided to them. These last are called home wet nurses.

The first cannot be watched; they attend to the child as they please, and at their leisure, either well or indifferently, according to their disposition. It sometimes happens that a nurse may be engaged in a district where a friend may visit her, to give her advice on the subject of the child, but it is not always thus. The nurses carry off the infant after having promised to wean their own child, but they do nothing of the sort, they suckle both of them. Doubtless their own is best taken care of, and what encourages them in this line of conduct, is, the want of surveillance.

When a child is to be brought up in the country, a place at a little distance from Paris should be chosen readily accessible, so as to surprise the nurse in case she should be inattentive. Preference should be given to women who live in a dry district and free from marshes. Thus the nurses of Normandy and Burgundy are the best; the nurses of Orléanais, of Berry, of Sologne are to be avoided, on account of the localities to which the children are brought. These countries are infected by intermittent fever; the children there are in general, pale, etiolated, and feverish; their belly swollen, their spleen enlarged, their legs œdematous; they often suffer from a fever which it is difficult to detect, and which ends by destroying them. These are the countries in which the mortality of children is the greatest.

Amongst the nurses from the country who come to Paris to seek children, some are unmarried, others are married to artizans, and others to agricultural labourers; selection should be made as much as possible from those last mentioned. They have their home, and frequently a cow, and if perchance they do not possess one, there is always one to be found not far off. Then we are sure that in case of the indisposition of the nurse, or of diminution in the quantity of her milk, the child need not suffer, since cow's milk which is readily obtained can be given it.

On the contrary, the nursing wives of artizans have no farm and no cow, and they sometimes live in places where it is a difficult matter to procure milk. When employment fails, misery enters the house; the woman suffers, her milk becomes changed, and the child experiences the

consequences of it, for they give it broths, soups, dry bread, and other kinds of food not suitable to its organs which are not yet sufficiently developed.

In the first case, nurses may without trouble give the children good milk ; it costs them nothing ; in the second, they must go farther to obtain it ; idleness, the inclemency of the weather, want of money, and a multitude of other circumstances, make the nurses stay at home and take other means to feed the children, to the detriment of their health.

Home wet nurses, are those who enter a house to suckle the child, in the midst of the family. It is especially to these that the recommendations about to be given must apply, and which may be equally useful to mothers who are suckling their children and to nurses in the country.

Nurses considered with respect to their Health, their Regimen, and to the Habits they should adopt with regard to the Children.

No change should be made in the habits and regimen of the nurses who come up from the country to live in the midst of society. It is impossible to make a peasant a gentlewoman, consequently they should not be harassed in this attempt. However, if their mode of living is not consistent with that which we have a right to require from them, for the advantage of the child, the practitioner should progressively modify what does not appear proper to him.

The regimen of these women should not be different from the ordinary regimen of the family in which they are engaged. It is only necessary to be careful to deprive them of highly-flavoured food, rendered too exciting by the spices contained therein. With this exception, nurses should eat all kinds of food, such as vegetables, *salads*, and *fruits;* drink wine in small quantity, or cider, if such is their habit; in a word, they may take all they can digest without doing themselves harm.

A special regimen is of no importance, for it is decided by all practitioners that, as regards the human race, that which has succeeded in the females of large domestic animals cannot be accomplished. In woman the qualities of the milk cannot be modified by the use of this or that variety of food. It is probable that some day this may be attained ; but in the mean time it is useless to restrict the nurses to one kind of food rather than to another. They should be allowed to follow the regimen of the persons with whom they live, and to eat whatever they can readily digest.

Nurses should daily take moderate exercise, at all times, and especially in the sunshine. This is as necessary for them as for the child which they rear. When out of doors, the nurse should be accompanied as often as possible. Great inconveniences might arise

from allowing them to go out alone, especially when we cannot depend on their conduct, and when they are not very reserved in their manners.

This observation leads to the consideration of the restraint in which nurses should be kept. Although it is not established that the union of the sexes may change the qualities of the milk, it should be forbidden. Conception may result from it, and then the milk diminishes, is altered, resumes the qualities of colostrum, and becomes unwholesome to the child.

During lactation, the modifications in the health of the nurses should be carefully watched. Some are subject to constipation, and will not own it for fear of being injured in the estimation of the parents. When their artifice is discovered, it is best to reprove them gently, and to prevail on them to have more frankness for the future; for it is a very important thing to acquire the confidence of nurses. This indisposition can never be attended with very serious consequences, and to effect its disappearance it will be sufficient to give one or two doses of the remedies customary in such cases.

Others, and these are numerous, observe the catamenia reappear before the termination of lactation. This was formerly considered a very serious affair, one that occasioned much alarm in the family, and necessitated the change of the nurse. It was thought that from this moment the milk assumed qualities deleterious to the child. But such is not the case, and this circumstance alone should not decide us to send away a nurse with whom we are satisfied in every other respect. In fact, I have made inquiries from a great number of women whose catamenia appeared during lactation, concerning the phenomena which the nursling presented. The greater number of them did not appear to suffer at all from it. Some were a little dull at this period, they had colic, and in some few cases a slight diarrhœa; others were more seriously affected, they had severe colic and an abundant diarrhœa.

Consequently, when the catamenia reappear in a nurse, future events should not be too hastily judged of. We should wait—for all that can be decided must evidently be subordinate to the attentive observation of these phenomena. The nurse should continue the lactation, and she should only be made to suspend it if, at the menstrual periods, the nursling should be in a state of indifferent health.

As to the other diseases of the nurse, and the influence which they exercise on the milk and on the health of children, we shall treat of them in a special chapter.

The habits of nurses should be attentively watched, as much on their account as on account of their child. They should not be allowed to give it the breast continually, although they do it with a good motive, because they say a child cannot suck too much, or because they wish to quiet cries which harass them. The hours of lactation should be

regulated, and when the child has finished its repast and cries without motive, it should be otherwise amused than by giving it the breast. This is the way to give it indigestion and to make it vomit.

During the night, nurses should take as much care of themselves as mothers do, and should take several hours sleep. For this they have only to accustom the child to suck less frequently than in the day time, and it will be sufficient to give it the breast once towards one or two o'clock in the morning, if it has been put to bed at nine o'clock and it is awaked at seven; if it cries in the intervals, the nurse may appease it and get it to sleep without giving it suck; it soon acquires the habit and only awakens at the hour of its repast.

A great number of nurses are in the habit of placing the child in their bed, without reflecting that it may fall to the ground, or that it may be suffocated by them. This is the most dangerous habit that they can acquire. The most decided opinion should be given concerning it, and they should be prohibited from it in the most positive manner. It is not sufficient for us to give this order, we should take care that it is carried into effect. This may be done without much trouble when the nurse sleeps in the room of the mother. When she reposes in a neighbouring room the supervision is more disagreeable, but the subject is sufficiently important to compel the parent to get up, in order to see if the child is always in its cradle.

On Artificial Lactation.

The term artificial lactation is confined to a particular mode of feeding children, in which, for want of the breast of a mother or of a nurse, milk or other substances are given them to drink by means of a glass or a bottle made for this purpose.

This is what is called rearing children by the feeding bottle or by the pap spoon (by hand).

This practice is deplorable, and, in spite of the examples of its success which may be cited, we may say that children fed in this manner are more difficult to rear than others, that they are more frequently ill, and, indeed, that the greater number die in consequence of this kind of alimentation. It more frequently succeeds in the country than in town. In the former case, at least, there is in some measure a compensation for this improper method of alimentation, through the influence of the good air and the qualities of the milk employed. But in towns, what compensation can there be in favour of these poor children? All are stinted and feeble, and the greater number end, as I have frequently observed, by contracting tubercular or inflammatory intestinal diseases, which take them into the hospitals, where they die. How can it be otherwise? How can the good qualities of a woman's milk, which is, in fact, the natural food of children, be supplied? How can the mild and always equal temperature

of this liquid be obtained, and in what manner can one hope to replace the fondness of the mother for the nursling which is suspended to her breast? This is assuredly impossible. Whatever precautions may be adopted, artificial nourishment will always be inferior to maternal lactation, when it is possible. Now, if it is granted that the alimentation is inferior, it is declaring that it is injurious; it should, then, be banished without reserve. Every attempt to carry it out should be condemned, and the physician should object to it with the whole weight of his authority.

I only express myself thus to oppose the foolish notions of certain mothers, who, at the moment of birth, are unwilling to suckle their child, and will not, moreover, trust it to a wet nurse, but rely, in a large town, on being able to rear it by the feeding bottle. It may rather be said that they are desirous of ridding themselves of it entirely. Occasionally there are some exceptional circumstances; weakness, disease of the mother, and the impossibility of hiring a nurse, may authorize the practice we are now considering. Excepting this unhappy position, a woman in good health, if she is poor, may suckle her child and work at the same time; or, if she works without intermission, she may yet gain the means of hiring a nurse.

The artificial lactation undertaken after several months of lactation by a nurse, cannot be censured to the same extent. The child is now more robust, its organs have become accustomed to digestion, and it suffers less from this mode of alimentation, which then very often succeeds. It constitutes an anticipated weaning which a multitude of circumstances authorize; the poverty of the mothers, who cannot pay the wages of the nurse, the difficulty of finding employment when disturbed once or twice a day to suckle the child, disease of the nurse, &c.

When, in consequence of these different causes, artificial lactation is adopted, how must it be directed? What kinds of food should be made use of, and in what manner should they be taken?

The milk of the cow is most frequently employed, for it is that which is the least expensive, and which can be most readily procured. For young children it should be diluted with barley water, or water gruel, or better still with toast and water. Chicken broth may also be employed with some advantage when the children are more advanced in age, but then milk may be given in its natural state. The mixture should be sweetened and prepared in small quantities, proportionate to the requirements of the child, so as to avoid entirely the process of fermentation which would alter the qualities of the milk. The temperature of the liquid should be an agreeable one and always nearly the same, which should be about 59° in summer, and 68° Fah. in winter.

The diluted milk is sufficient for the nourishment of the child during the first few months; but at a more advanced age, towards four or five

months, according as the child manifests the want of a more substantial nourishment, semi-liquid kinds of food may be added. Pap made with wheaten flour or with dry and very fine bread crumbs may be given twice a day.

Many other substances are used for this purpose: semola, potatoe starch, arrow-root, rice cream, racahout, Brussels biscuits, and a great number of which are excellent, but inferior to those we have just mentioned.

To these kinds of foods may be successively added pottage made of bread, butter and yolk of egg, soups made from boiling light meat, fresh eggs eaten with a sippet of bread. Later, at the natural periods of weaning, the food which ought subsequently to compose the nourishment of the child should be administered.

Children readily take liquids from the spoon or glass; but that gives them no trouble and does not exercise their muscles like suction, for example, which requires the combination of special muscles, and the simultaneous action of the muscles of respiration. This motive alone should establish the use of feeding bottles, to the orifice of which the child applies the mouth and makes efforts of suction as if it was at the mother's breast.

Of all the feeding bottles, the most simple, the least expensive, and the best, consists of a glass phial and holding about three ounces, and arranged in the following manner. A piece of fine sponge, trimmed on purpose, is placed in the neck, projecting an inch further than it, and the whole is covered by a piece of cambric or muslin fastened by means of a thread. This thread should press moderately on the sponge so as to slacken the flow of the liquid. Care must be taken to keep the sponge moist, and to wash it well twice a day, in order that the milk contained in it may not become changed, and give an unpleasant flavour to that which passes through it.

There are other feeding bottles more elegant but not more useful. Of these the most suitable and the most appropriate to introduce into the mouth of children, is the feeding bottle of M. Charrière. The end, which is shaped like a nipple, is pierced in the centre by a small opening; it is composed of ivory, rendered flexible and supple by a particular preparation when it is damp.

Drink is given to the child as often as it manifests the want of it, and when the period arrives for feeding it in a more substantial manner, the broths which have been mentioned may be given at first once, afterwards twice a day. After its repast, the sucking bottle is again given it, the liquid which it swallows serves to dilute the food and facilitate its digestion.

On Lactation by means of an Animal.

The fashion for this has gone by, but formerly animals were rather

frequently employed to suckle children. In order to judge of the results of this practice, it is necessary to have had great experience of it. What I have seen of it does not influence me in its favour. But I shall abstain from all comment.

"The goat is most frequently employed for this purpose. The size and shape of its teats, which the mouth of the child may readily seize, the abundance and the qualities of its milk, the facility with which it may be placed so as to present its teats to the child, the attachment which it is susceptible of forming for it, are the motives for the preference which is given it. The milk of the ass has also been recommended as presenting greater analogy with that of the woman; but as it is very difficult for the child to get at the teats of this animal, its use is almost exclusively reserved for the cases in which the child is reared by the feeding bottle. This kind of lactation requires the same precautions as lactation by a wet nurse, and in addition great care and attention at the commencement in presenting the child to the teat, to ensure it from the accidents to which it would be exposed by the petulance of the animal, until it is accustomed to come of itself and offer the teat to the child, which should be placed in a cradle slightly raised from the ground. The choice of the animal also deserves some consideration. A young goat should, if possible, be chosen; one which has brought forth naturally, which is not at its first litter, and which is naturally quiet and docile; one which has already served to nourish a child is very much to be preferred. The milk of a goat that is too old is not sufficiently substantial and is not so abundant; that which is at its first litter has less milk, and it dries up sooner. If it is a long time since it brought forth, it would not furnish it for a sufficient length of time, for the secretion of milk is suspended when the animal is in heat, and the little milk it furnishes then is of bad quality. It is generally considered that the milk of goats of the hornless variety is best and has less of that hircine odour which is peculiar to this milk; but the goat-herds of the environs of Lyons, where they raise a large quantity of these animals for the manufacture of cheese, declare that there is no foundation for this opinion. The colour of the animal on the contrary, has a very manifest influence on the nature of its milk; that of white goats is almost free from smell. As is known, the nature of the food also influences that of the milk; advantage has even been taken of this fact to communicate to it, in certain cases, medicinal qualities. Lastly, the quality of the milk also depends on the idiosyncracy of the animal which furnishes it. There are animals which only give a milk of bad quality and disagreeable taste, which can only be recognized by tasting it. These cases are very rare, it is true."*

* Désormeaux: *De l'allaitement.*

On the Regimen of Children.

The feeding of children and the order of their repasts must be regulated so as not to expose them to attacks of indigestion and to the slight accidents so frequent amongst those who are fed without method.

Children are very ravenous during the first months following birth, and if their wish were complied with, they would be for ever hanging at the breast of their nurse. It is sufficient for them to suck every hour at most, and every two hours at least, during the day. During the night, on the contrary, there should be more interval between their repasts, so as to allow their nurse some period of repose, and as has been previously observed, they may be accustomed only to suck two or three times. Towards the third and the fourth month, the interval between the hours of lactation must be still further increased.

When they are disposed to suck, they should be left to satisfy themselves at their ease, and allowed to quit the breast of themselves. They often fall asleep there; then they should be gently placed in their cradle, where they are infinitely better than on the knees of their nurse.

Some children sleep much in the day time, and do not awake to suck; they should be permitted to enjoy their sleep. However, when it becomes prolonged beyond certain limits, it is sometimes the result of a serious morbid condition of the nurse, which should give rise to considerable anxiety. Thus, M. Donné relates that certain children, strong and of good constitution, provided with excellent nurses, are observed to sleep much in the first days of their existence, without appearing to have any appetite or any want; but this is much more frequent amongst weak and ill nourished children. "They give themselves up to a lengthened sleep when they find in the milk of the nurse neither a sufficiently abundant nor a sufficiently substantial nourishment; it appears that nature would thus compensate for the insufficiency of the alimentation; prolonged sleep is then, in certain cases, the sign of an incomplete and indifferent alimentation, and should call attention to the state of the nurse. Examination will often lead to discovery that she has only a limited quantity of milk, or that her milk is poor and watery; and if we direct attention to the child, it will soon be perceived that the child does not thrive; for the manner in which the child thrives is the surest means of judging the qualities of the nourishment it takes, especially at the commencement, at the period when its existence is not yet disturbed by any suffering, or by any accident."*

The milk should, then, be the exclusive food of children during the first months following birth. At the fourth or fifth month, a crust

* Donné: *Conseils aux mères sur l'allaitement et sur la manière d'élever les enfants nouveau-nés.* 2nd édition; Paris, 1846; p. 174.

of bread may be given them to suck, and a little weak sugared wine and water given them to drink. Later still, a little cow's milk may be given, and then broths, made as has been described under the head of artificial lactation. In every case, if the child thrives well with his nurse, if it is plump and well developed, it is useless to have recourse to the employment of these artificial means. The child may be kept at the breast of the nurse to the eighth or tenth month. At this period it is prudent to give it other kinds of food, so that its stomach may become habituated to it, in case a disease of the nurse should necessitate the suspension of lactation.

When they begin to feed the child, it should be by means of soups made with milk or butter; fat food should be forbidden until the end of the first year. These substances are more difficult to digest than those we have referred to, and are not, before this period, appropriate to the requirements of the child. They are not proper until the period of its passage from parasitical to independent existence. This transition can hardly take place without bad symptoms ensuing until towards the age of ten to twelve months.

[Dr. Churchill (on *Diseases of Children*, p. 31) recommends the following article of diet, which is called by him, "bread jelly."

"A quantity of the soft part of a loaf is broken up; and boiling water being poured upon it, it is covered and allowed to steep for some time; the water is then strained off completely and fresh water added, and the whole placed on the fire and allowed to boil slowly for some time, until it becomes smooth; the water is then pressed out, and the bread, on cooling, forms a thick jelly, a portion of which is to be mixed with milk or water and sugar for use as it is wanted. The steeping in hot water, and the subsequent boiling, removes all the noxious matters used in making the bread, and it both agrees very well with the child, and the child likes it very much."

In a late number of the *Journal für Kinderkrankheiten* there is a paper by Dr. Gumprecht of Hamburg, calling the attention of the profession to a novel kind of food, viz., carrot pap (Karotten brei). It is true that as far back as 1819, Friedländer in his work *Sur l'education physique de l'homme*, remarked "on fait en Vallachie du bouillon avec des carrottes;" and in 1830, Schmidhmann stated, that in Turkey, carrot pap was highly prized as a nourishment for young children; yet it is due to Dr. Gumprecht to say that all credit attaches to him for bringing it prominently before the notice of the profession, and for its present use in Germany, through the recommendations of some of the first authorities there. At the request of Gumprecht, Müller of Hamburg, Mauthner of Vienna, Münchmeyer of Lüneberg, &c., have employed it, and speak highly of its value. Wakenroder gives the following analyses of the expressed and inspissated juice of the carrot:

Oil, fatty	1.00	Sugar	93
Oil, etherial		Malic acid	
Albumen, veg.	4.35	Starch	
Karotin	0.34	Lime	
		Alumina	
		Oxide of iron	

But as the scraped root of the carrot contains other matters than the above, especi-

ally a large quantity of ligneous substance, which cannot be digested, and which will remain often two or three days in the intestinal canal before being discharged, and be highly detrimental to the delicate mucous membrane of children, it becomes important to separate that which will be useful from that which will not. Gumprecht advises an ounce of finely scraped full grown carrot to be mixed with two cupfuls of cold soft water and allowed to stand for twelve hours, being frequently stirred during this period. The fluid portion is then to be strained off, what remains to be pressed to yield some more. This fluid is then to be mixed with the proper quantity of biscuit powder, or bruised crust of bread, or arrow root, &c., and the pap placed over a slow fire, until it begins to bubble. Care must be taken that the heating be not pushed so far as to cause boiling, or the albumen will coagulate. After its removal from the fire it is to be sweetened with a due amount of white sugar. Dr. Gumprecht states, that by mixing the coarse juice with biscuit, crust of bread, or arrow-root and sugar, we obtain all the farinative and nutritious elements required, viz., albumen, gluten, starch, sugar, fat, and the phosphates of lime and magnesia. This food is more particularly adapted for children who have been suckled and are being weaned; for those who are being brought up by hand, the following preparation is deemed more advisable: an ounce of *very finely* scraped yellow carrots, and two drachms of biscuit powder, are to be mixed with two cupfuls of cold soft water. This must stand in a covered vessel, in a cool place, for twelve hours, and be frequently stirred during this time. It is then to be drawn off, or strained through a linen cloth. Some sugar candy and a pinch of salt are to be added to the fluid, which may then be administered by means of the sucking bottle, care being taken that the food is at the proper temperature. We may state, that Zeise of Altona (Annal. v. Wöhler u. Liebig, 1847) has given a scientific reason to support a practical belief common in Germany, viz., that the carrot is a good anthelmintic. He states the elementary composition of *Karotin* to be $=C_5 H_8$ and polymeric with the oil of turpentine and its usual contained matters. The above preparations of the carrot are contra-indicated as diet, when there is any tendency to diarrhœa, and Mauthner and Münchmeyer, who employ them, believe that another drawback to their use is the trouble which their preparation involves to the poorer class of mothers who are often careless and indolent.—*British and Foreign Medical Chirurgical Review*, vol. vi.

THE FOLLOWING IS THE DIET TABLE OF THE HOSPITAL FOR SICK CHILDREN:

	SIMPLE DIET.	PUDDING DIET.	BROTH DIET.	MEAT DIET.
Breakfast at 8 o'clock.	Bread, 3 ounces, scalded with water, 1 half-pint. Ditto with milk, quarter-pint.	Bread, 4 ounces. Milk, half-pint.	Bread, 4 ounces, with butter. Cocoa, one-third-pint. Or bread and milk.	Bread, 4 ounces, with butter. Cocoa, one-third-pint. Or bread and milk.
Dinner at 12 o'clock.	Bread, 1 ounce. Gruel or thin arrow-root, half-pint.	Rice pudding, bread pudding, or suet pudding. Milk and water, quarter-pint.	Bread, 2 ounces. Mutton broth, with vegetables, half-pint. Mashed potatoes, 4 ounces.	Roast mutton, 3 ounces (when cooked). Mutton broth (strained), half-pint. Mashed potatoes, 6 ounces.
Tea at 4 o'clock.	Acidulated barley water, rice drink, or white decoction.	Bread, 4 ounces, with butter. Milk and water, one-third pint.	Bread, 4 ounces, with butter. Milk and water, one-third-pint.	Bread, 4 ounces, with butter. Milk and water, one-third pint.
Supper at 6 o'clock.		Thin arrow-root, one-third-pint.	Gruel, one-third-pint.	Gruel, one-third-pint.

Children under eight years old to have a third less.
Extras, as mutton chops, fish, eggs, beef tea, &c., may be ordered, as may wine, beer, or spirits, for any of the patients for whom the medical officers think fit to prescribe them.

RECEIPTS FOR THE FOREGOING DIET TABLE.

Cocoa.—Cocoa nibs, half-ounce; water, one pint; boil to half-pint; add half-pint of milk, half-ounce of sugar.

Gruel.—Grits, 1 ounce; water, two-thirds-pint; milk, one-third-pint; sugar, half-ounce.

Milk and water.—Milk, two-thirds-pint; water, one-third-pint; sugar, quarter-ounce.

Arrow-root.—Arrow-root, half-ounce; water, three-quarters-pint; milk, quarter-pint; sugar, half-ounce. *Thin arrow-root for drink*, made with quarter-ounce of arrow-root.

Rice pudding.—Carolina rice, half-ounce; sugar, half-ounce; milk, half-pint.

Bread pudding.—Either boiled or baked.—Half-breakfast cup or 2 ounces of bread crumbs, 1 egg, half-pint of milk, half-ounce of sugar.

Mutton broth.—Half-pound meat, 1 ounce carrot, 1 ounce turnip, half-ounce barley, 1½ pint of water, to make 1¼ pint of broth. Served with the meat in it.

Suet pudding.—Half-pound flour, half-pound suet, half-pound bread crumbs, with a little salt and a little powdered ginger, if liked, mixed with water, and boiled for two hours.

Mashed potatoes.—Mashed without butter, with milk only. The meat for mutton broth, neck of mutton. For meat diet, mutton legs and shoulders only.

Acidulated rice drink.—1 ounce ground rice, 2 quarts water; boil and strain; sweeten with barleysugar, 1 ounce; acidulate with 1 ounce lemon juice.

Acidulated barley water.—Barley water, 3 pints; 2 lemons sliced; boil to a quart; sweeten with 2 ounces loaf sugar.

White decoction.—1 ounce bread crumbs, half-ounce hartshorn shavings, 3 pints water, boil to two; flavour with lemon peel; sweeten with 1 ounce sugar.

P.H.B.]

On Weaning.

The term weaning is applied to the changes introduced into the alimentation of children, when it is desired to deprive them of the breast of their nurse, so as to give them an independent existence by accustoming them to the food they should use in the course of their life.

This is often a critical time for children, either because the transition has not been properly managed, and has been too violent and premature, or because it has not been made at a favourable opportunity.

Except in the case of special circumstances, such as a serious disease of the mother or of the nurse, lactation should not be interrupted before the age of twelve or eighteen months. It would be inflicting a serious injury on the child to wean it too early; first, because its development experiences a momentary retardation; again, because the organs are not sufficiently accustomed to the stimulus of the food which may be given it, without more or less serious accidents resulting from it; lastly, because at the moment of the dental evolution, the breast is a great consolation to children, who ardently attach themselves to it and thence derive great alleviation to their suffering. It should be delayed until the process of dentition is much advanced, or nearly finished; consequently, the period of weaning should be fixed at the age of twelve or eighteen months. For my part, in directing the weaning of children, I always select one of those moments of repose which is observed in the eruption of their teeth, and I never put a stop to lactation until after the appearance of the canine teeth. In this manner the child is in possession of the first fifteen or sixteen caducous teeth, the evolution of which is the most difficult; and there only remain the last four molars to be cut, which usually appear with great facility.

It is equally wrong to prolong lactation too much; for great difficulties are often experienced in interrupting it, and the child may suffer from not having food sufficiently substantial for its age.

When, then, the period fixed for weaning is come, it should be commenced by leaving off lactation in the night time, and by familiarizing the child with the food which should form a portion of its regimen for the future. In this manner it is not deprived of the breast of its nurse, that is to say, of the milk, until it is in a state to be fed differently. Then it should be accustomed to bread; to sweetened weak wine and water; to thin, weak, or nourishing broths once or twice a day; to the use of meat, which is to be given it in small portions to suck; and, lastly, when it is sufficiently accustomed to these kinds of food, at the end of about a month, suckling is suddenly stopped. At first, the child cries and is obstinate; but if it is not ill, it must be resisted, and it soon gives up, making amends in the food for the breast of which it is deprived. Some, notwithstanding, continue obstinately attached to the breast of the nurse; in order to cause a distaste for it, a bitter, but harmless, solution of gentian or aloes, the flavour of which is very disagreeable and effectually repels them, should be applied round the nipple. Instances have been observed of mothers prolonging lactation much beyond the time when it should cease, but these cases are exceptional. Thus, M. Baffos used formerly to relate to his pupils at the hospital for children, the history of a lady who much dreaded the period of her son's weaning. She continued to suckle him, and towards the age of three years, when she called him one day to give him the breast, he answered—"Really, mamma, I don't wish for any more."

["The term of nursing will depend upon various circumstances, such as the health of the child or mother, the abundance of milk, &c. Some women are not able to suckle more than six or seven months; some continue for two or three years. I know a lady who nursed a child (now a tall, strong man) until he was able to draw down the blinds and bring her a footstool, previous to his taking his meal. Astruc and others advise nursing for two years, and the lower orders occasionally practice it to avoid pregnancy. But these cases are exceptions; and I believe it will generally be found, that nursing prolonged beyond twelve months is unnecessary for the child, and positively injurious to the mother in most cases. Taking this as one extreme, we may fix the other at nine months, and conclude that it is desirable that a child should not be weaned before nine months, nor suck after twelve. By this time he will be provided, generally, with a sufficient number of teeth to make use of the proper food, and he will have retained the comfort of suckling until he has passed through the first trouble of teething."—*Churchill on Diseases of Children*, p. 28.—P.H.B.]

After weaning, the regimen should be simple, and composed of the most delicate substances of the family food. It should include no highly flavoured or strongly spiced food, which may possibly be suitable for adults, but would assuredly be injurious to these young children. They should make several meals a day, for if they eat but little at a time, they should eat often; this is a fact well known to mothers of families, who are quite alive to this point.

The diseases of weaning were formerly alluded to as diseases of a special nature, in relation with the change in the alimentation of children. These affections possess no peculiarities, and present at this period the same characteristics as in the other periods of early childhood. Most of them appear as simple phenomena of coincidence without any relation of cause to effect. There is one, however, which appears to be in special relation with weaning, this is inflammation of the alimentary canal. Its characters are not in any way modified; and its development may be prevented by the employment of the means capable of softening the transition between lactation and independent existence.

CHAPTER IV.

ON THE HABITS, EXERCISE, SLEEP, AND REST OF CHILDREN.

Nothing is more dangerous than to allow children to acquire bad habits. Their cries then possess such a ready and absolute means of command, that those who surround them become their slaves, and submit to their most trivial wishes, in the dread of exciting their anger and of doing them injury.

It was formerly the custom to send children to sleep by rocking them in the arms, or in the cradle; but proper remarks have caused these means to be abandoned, so that we rarely have occasion to forbid it now. However, the necessity is still pretty generally believed in, of sending the children to sleep, either by caresses when they are in their bed, or by holding them on the knees until sleep has weighed down their eyelids. It then happens that if other occupations should distract the nurse from this attention, the child cries until some one sends it to sleep; and when it awakes in the night, they are obliged to fly to its bed and recommence the same caresses. This is a bad habit to allow children to acquire, who would always wish to have some one near them during their sleep, or would sleep on the knees of their nurse. They can be brought up differently, and their sleep is not, on that account, the less beneficial to them. They have only to be placed quite awake in their cradle, and they quickly get into the habit of falling asleep there. It costs but little to follow this line of conduct from the very commencement of lactation; it is very advantageous in this sense—that the children become very docile, and allow the nurse all the time necessary for her rest.

When this bad habit is established, and when it becomes irksome to the parents, it may be destroyed with a little courage and determination. All that is required is to resist the cries of the children, which

is possible, when it is known that they are not suffering, and that they are not in want of anything. They are to be left in their cradle to fall asleep alone: the first day their distress is great, but their cries soon abate when they see that it is resolved not to satisfy their whim. This lasts for two or three days; and then they give in and fall asleep as soon as they are placed in their bed.

Exercise is one of the most important constituents of the hygiene of children who live in towns. It is the only means of supplying the disadvantage which exists in their not being brought up in the country.

Even young children should be accustomed in all kinds of weather to the influence of the external air, care being taken to clothe them appropriately, according to the temperature. Long walks, both in summer and winter, are very advantageous to them: it favours their development, and gives tone and colour to the skin. The sun is especially advantageous to them, and it is useless to endeavour, as is frequently the case, to shade them from its rays, from which they derive a salutary influence.

There is no reason, except the presence of disease, which should prevent children from going out. It is much against their interest to believe that walking and exercise in the house, in the open air, or in a garden, can be replaced by the opening of the windows of their room. They should be taken out of doors, and if possible, the greater part of the day should be passed with them there.

Children live so rapidly, their functions are so quickly performed, that they require frequent reparation. It is on this account that often repeated feeding and sleep are so necessary to them.

The night time is not sufficient for the repose of children; during the day they also sleep for some hours, and during the two first years of their life, this sleep should be carefully attended to. The hours of the siesta should be always so arranged as not to interrupt the daily promenade, especially in winter, when they can only go out at certain times of the day. At a later period this habit must be destroyed; sleep in the day time is no longer necessary, and it prevents that in the night being so advantageous to them as it otherwise would be.

Children should lie on soft beds on account of the delicacy of their limbs, and their cradle should be protected and padded on the sides, so that their movements should not cause them any injury. The formation of the bedding deserves a special attention. The bed and the pillow should be filled with oat-straw, perfectly dry and without odour, or with fern leaves, the odour of which is very agreeable. Feathers, down, and wool are more injurious than useful, on account of the heat which they develop, and the facility with which they become impregnated by the odour of urine. Care should be taken to place the child in such a position that the eyes be not exposed to too strong a light, and they

should be directly opposite the daylight. The air of the room in which it is placed should be occasionally renewed.

Covering up children too much in their cradle is unfortunately a very common error; under the pretext of guarding them from the impressions of air, they are nearly suffocated beneath heavy coverings, they are bathed in perspiration, their bodies become covered with red spots and miliary vescicles which are sometimes taken for a serious disease, whilst they are really the results of the practice above referred to. They disappear as soon as the immoderate covering of the children is left off.

CHAPTER V.

ON THE CLOTHING.

It is now understood that children should be clothed to protect them from the influence of external agents, and particularly of the cold, and not to fetter the liberty of their movements. The use of swaddling clothes, as they were formerly constructed, is abandoned. Children are no longer imprisoned in their clothes, with their legs stretched out and motionless, their arms firmly fixed by the side of the body, and the head drawn down to the front of the chest. They are left nearly free in the clothes which envelop them. This is the principle which should rule over the clothing of children.

The baby linen now used is made up of the following pieces. A linen chemisette and a woollen bodice, opening behind and fastened with pins, covering the breast and arms. A napkin, also of linen, and a skirt of cotton or of wool, according to the season, destined to envelop the lower part of the trunk and the thighs. These portions of dress are fixed to the middle of the body which they should enclose. The napkin envelops the limbs, and serves to isolate them and to prevent any friction of these parts; the skirt, placed over it, covers the united limbs, and as it considerably exceeds the length of the child, it is turned in, and by folding it envelops afresh the inferior portion of the body. All these portions of the dress should be quite loose, and should be kept n position by means of strings or pins. When pins are made use of, they should be carefully introduced, so as not to injure the skin. Sometimes the point is not completely brought out, and enters the flesh on every motion of the child. The unfortunate babes cry incessantly until they are undressed. I have seen one who had the skin of the back completely transfixed, as well as the chemisette and bodice. This little being uttered dreadful cries. It continued three hours in this dreadful state, until it had a severe convulsion, and it was not until it was undressed that the cause of the symptoms was discovered. This case should serve as a

lesson, and it imposes on all mothers the obligation of undressing children who cry obstinately, in order to discover if perchance some misplaced pin is not the cause of this manifestation of pain.

Children should be early accustomed to keep the head uncovered, for this part is less easily impressed with cold than other parts of the body. Young children should have it but slightly covered. A woollen cap placed under a linen one is made use of for this purpose, both of them sufficiently large so as not to impede the development of the head and compress the brain. It is important to attend to this recommendation, so as to avoid the accidents which may result from compression of the head during infancy. In fact, an attempt has been made, but without much reason, to refer to this cause the development of many diseases of the brain, and especially mental alienation.

I shall not bring the subject of children's dress to a conclusion without referring to flannel, and without condemning the use of it, if it become too frequent for the requirements of infancy. This soft woollen tissue, which is immediately applied to the skin, is only proper for children born before their time, for those who are very feeble, and, lastly, for those who may be considered weak chested, in consequence of the original vitiation of the parents. In these cases it is truly serviceable to those who use it, and who derive benefit from the genial warmth in which they live.

On the contrary, children who are tolerably well developed, and who inspire no fear on account of their constitution, should not be clothed in flannel. It is the means of enervating them, and rendering them too susceptible of the influence of cold. It is much better to adopt an entirely opposite method of rearing them, by washing them every day with cold water at 68° Fah. Flannel is an injurious clothing for them, one which keeps the skin at too high a degreee of heat, especially when the external temperature is high, and thence abundant perspirations result, and sudatorial eruptions, sometimes accompanied by intolerable itching.

CHAPTER VI.

ON THE TOILETTE AND CLEANLINESS OF CHILDREN.

The state of the body of children in relation to cleanliness cannot be too attentively cared for. The care employed with this object forms one of the fundamental conditions of a good physical education, and it also possesses the advantage of strengthening the individuals, and of putting them in a condition to resist more easily the unfavourable influences which may attack them during their existence. These precautions

are quite as necessary in young and delicate children (whose skin, frequently soiled by the natural evacuations, is more liable than under any other circumstances to become inflamed by contact with them) as in those who are robust and vigorous, towards whom it does not seem necessary to adopt these precautions. In all they have for their result the development of the activity of the perspiratory functions of the skin, of the constitution, and of the general strength of the individual.

Important questions have been raised on the subject of baths, in regard to their frequency and temperature.

In order to strengthen children, it was formerly thought very essential to wash and bathe them in cold water some days after birth, and to continue this plan until rather an advanced age. Hufeland was of this opinion; but he shows himself more scrupulous in the employment of these means, for he recommends waiting until the sixth week before they are put in force. Then, says he, the whole body should be washed every morning with tepid water, which is gradually made colder. This constitutes the best means of strengthening the nervous and cutaneous system, and of preserving children from nervous, catarrhal, and rheumatic affections. It is thus that they become inured to the injurious influences to which they are exposed in the course of their existence.

These ideas have gradually disappeared from the hygiene of children, for the application of them might be prejudicial to many, and especially to the most delicate. Whatever may be the weakness of these little beings, we wish to rear them, and this is accomplished by means of care and precaution. It would be seeking danger uselessly to bathe them too early in cold water, and we must be satisfied with washing the body with water slightly tepid, according to the season, and by means of a toilette sponge. This operation should be rather quickly performed, and immediately followed by gentle frictions on the skin with a fine linen cloth or flannel, so as to absorb the water and prevent the chilling of the body. In the day time, when the child requires changing, it should be again washed, and the linen removed as often as necessary.

Every time the child is washed, after having dried it, the body should be powdered, and especially the neighbourhood of the natural parts, with marechal powder, or by perfumed lycopodium powder. These substances protect the skin against the irritating action of urine and the excremental matters.

Some practitioners recommend the use of daily baths, but this is really carrying the practice of cleanliness too far. When the frequent washings of a child well attended to during the day are considered, the administration of a daily bath may be looked upon as superfluous. We even regard this bath as injurious, for it fatigues and weakens the children rather than strengthens them. A bath of simple water, for twenty minutes, repeated every two days, and even once a week, may

suffice. The temperature of the baths should be agreeable and moderate. In summer they may be given nearly cold, but then they should be very rapidly accomplished, and prolonged for some minutes only. They should be 86° Fah. in winter and 68° in summer. Bathing in a river is only proper for children above the age of five years.

The head requires as much, and probably even more care, than the body, for there still exists generally, and especially in persons of the poorer classes, ridiculous prejudices on the subject of the cleanliness of this part. A great number of mothers of families consider the brownish crusts on the head, vermin, and even the various eruptions of the scalp as necessary for the preservation of the health of their children. Many will not have these abominations disturbed. Nevertheless, the parents must be prevailed upon to remove them, so as to avoid the diseases of the scalp, impetigo in particular, which invades the ears and the eyes, and produces enlargement of the glands of the neck. To keep the head in a state of cleanliness, it is sufficient to wash it at the same time as the body, with simple water of the same temperature.

CHAPTER VII.

OF THE INFLUENCE OF ANTECEDENT AND ACTUAL DISEASES OF THE NURSE ON THE HEALTH OF CHILDREN.

I now approach one of the most debated, most difficult, and most important questions in medicine. Its importance will be well understood by those who have made the treatment of children their study. In fact, as we have already seen, it is highly essential to ascertain the former state of the health of mothers and nurses at the time of making choice of the person who should undertake the lactation of infants. It is not the less necessary to study the diseases of nurses, in order to ascertain their degree of influence over the health of children. In this manner we learn to distinguish the cases in which lactation should be interrupted from those in which it should be allowed to continue, and the circumstances which may authorize the change of nurse are scientifically determined.

This subject deserves the greatest attention. Physicians have but very rarely considered it in this manner. All those who, by the depth of their mind and by the extent of their experience, might have enlightened us on this point have not done so, or at least have not published the results of their researches. The history of hereditary disorders is common enough, but as regards the influence of the diseases of the nurse, little mention is made of them by authors. Few persons have investigated this subject; and the only guide we have in our

labour consists of isolated allusions contained in treatises on midwifery, in researches on the milk, and in the foreign Latin dissertations of Platner, Baldini, Marianini, Wagner, &c. Here and there may also be found vague information on this subject; wonderful histories, always the same, vauntingly repeated by authors with the intention of demonstrating the influence of the moral affections of the nurse. The question is nowhere treated in a special manner, as we should desire to have it treated at the present day. Recently, however, a very conscientious author, M. Donné, has made great progress in this study. This physician, in his researches on the milk,* has described the alterations of this liquid, and has studied the influence which they may have over the health of the children. Further on, we shall refer to these observations, which deserve the greatest attention.

Division of the subject.—In order clearly to understand what follows, we must carefully separate—1st, that which relates to the influence of the antecedent affections of the mother on the health of the children, that is to say, all which relates to hereditary transmission from the mother; 2nd, that which relates to the influence of the actual diseases of the nurse.

In the first case the transmission is but an original vitiation, dating from the day of impregnation; in the second, on the contrary, the vitiation is accidental and takes place by means of lactation. Such are the chief circumstances which constitute the basis of an important division.

We shall then have successively to study—1st, the influence of antecedent diseases of the mother on the constitution of children, so as to corroborate this fact already well known, namely, the transmission of disease by generation; but we shall be brief on this subject. 2nd, we shall then treat of a more important question, relative to the influence of actual diseases of the nurse mother, or of the nurse herself on the nursling. In this place, the diseases of infancy acquired by lactation may be studied. Lastly, we shall conclude (and this will form the end of this chapter) by the recital of the considerations which necessitate the change of nurse.

1st. Influence of antecedent Diseases of the Mother on the Constitution of her Child.

The facts which relate to hereditary transmission by the mother are in general well known and accepted by all medical men. We can merely refer to them here. They may be classified in the following manner:

1st. Transmission of physical and moral characteristics, of the features, and of the qualities of the mind.

* *Cours de Microscopie*; Paris, 1844; pp. 347 *et suiv.*

2nd. Transmission of vices of organization and of deformities such as myopia, colour of the skin and the hair, the webbed form of some of the toes or fingers, increase in the number of the fingers in sexdigitarians, &c.

3rd. The transmission of the diseases of the pregnant women to the fœtus; small-pox, for example, a fact positively established, and which I have once observed; syphilis—but examples of this kind are rare; they are called connate diseases.

4th. The transmission of certain diseases, the development of which has taken place soon after birth; syphilis and scrofula in all their forms and in all their manifestations; nervous irritability, convulsions, &c.

5th. The transmission of the diseases which only appear at a much later period: gout, gravel, asthma, cancer, &c.

It is useless to insist any longer on these facts, which do not require further proof, and which, moreover, concern us but little at the present moment. It is well to consult them at the time of giving advice about a conjugal alliance, and in the course of the pregnancy, when it is required to know if the mother may undertake the suckling of her child.

Amongst these affections, there is one however—syphilis—which has not been so well studied as the others, and which is, perhaps, more difficult to recognize in children. It is the only one which I feel it necessary to investigate. I shall do it with so much the more advantage, as I can add to the small number of my observations the valuable information that one of my kind friends, Dr. A. Deville, late interne of the Lourcine Hospital, has been so kind as to furnish me.

There is no fact better established, better authenticated, and more frequent, than that of the transmission of syphilis by generation.

May it originate equally from the father and from the mother? The question is not yet decided, and it may not be for a long time as regards the father. In fact, women are often ignorant of the state of the health of their husband in this respect. They are unable to enlighten the physician who interrogates them. In the hospitals, the father is unknown, and he himself cannot be questioned. In town, we hesitate to put indiscreet questions, which might sometimes disturb domestic peace. Consequently, everything seems opposed to the possibility of discovering the truth. It is sometimes accomplished, but with great difficulty, and then we run great chances of error, notwithstanding the precautions which have been taken. It is, doubtless, in consequence of these difficulties of observation, that many authors have very incorrectly denied the transmission of syphilis originating from the father. This transmission is probable, and, indeed, quite as real as the transmission of a webbed finger, the colour of the hair, scrofula, &c.

As to transmission by the mother, this is a common fact, and one

which is daily observed. It is not even rare to find positive examples of transmission of the disease by the mother alone, the father being quite healthy. M. Deville related to me the history of a lady with whose family he was acquainted, who, unfortunately, had chancres and mucous tubercles on the vulva. No general treatment had been pursued, and the local phenomena disappeared. Scarcely recovered, the patient, undoubtedly affected with latent syphilis, married and became pregnant; at the eighth month she was delivered of a dead child, covered with mucous tubercles; the father enjoyed excellent health, and had never had any syphilitic affection, this he affirmed with a frankness and sincerity against which M. Deville could raise no doubt.

The woman who transmits syphilis to her child, may find herself, at the time of confinement, in three conditions: 1st, she presents *secondary* syphilitic symptoms; 2nd, she does not present them at the very moment, but she may have them at a later period; 3rd, she has had them previously.

1st. The mother is affected with secondary syphilis (indurated chancre, mucous tubercle, falling off of the hair, and crusts on the scalp, pains in the head and in the joints, papulæ or pustules, followed or not by ulcerations, &c.) at the time of confinement. These constitute the most decided cases, against which no doubt can be raised, and which the most superficial observation has enumerated from the most distant periods.

2nd. The mother will present at a later period the phenomena of constitutional syphilis; but she was already under the influence of syphilis, she had latent syphilis. Nothing is more common than this. A woman has contracted chancres; almost invariably, if constitutional syphilis results, the chancres becomes transformed *in situ* into mucous tubercles, or into indurated chancres, and all may stop there. But the patient is now affected with constitutional syphilis, although there may be nothing apparent on the exterior of the body, and if a proper treatment is not applied syphilitic symptoms, easily recognized, will afterwards develop themselves. If in the period which elapses between the time in which a patient has had an indurated chancre or a mucous tubercle and that in which she exhibits other syphilitic symptoms, pregnancy or delivery ensue, there is a probability that the child is infected. This observation has established.

3rd. The mother has had syphilitic symptoms either before pregnancy or before confinement. If a proper treatment has not been pursued, although these symptoms may have disappeared *as local and apparent phenomena*, the patient is not the less under the influence of constitutional syphilis, which may, at any time, betray itself by the manifestation of fresh syphilitic eruptions or of other external symptoms. It is in these cases especially that she can transmit it to the child.

Are *primary* syphilitic phenomena transmissible by inheritance? When we give ourselves the trouble to observe and not to fabricate theories to which we afterwards endeavour to make the facts apply, we very quickly see that this transmission never takes place. Attentive observation readily demonstrates to us the origin of the *primary chancres;* they are, however, very rarely observed in the newly-born. In these cases the mother always presents a chancre at the time, the pus of which becomes inoculated by means of an abrasion or of a wound made in the child's skin. But this pus may originate from quite a different source; for example, from persons who attend to the child, or from the linen in which it is wrapped, so that the result will be the same: inoculation will be effected. It is not necessary to dwell upon this further to show that this is not one of the facts which is comprehended under the term of hereditary diseases; but it was necessary to give some details on this subject.

The true syphilitic symptoms, plainly transmissible by inheritance, are the *secondary* symptoms.

Is it by the *germ* at its origin, or rather by the materials extracted by the fœtus from the maternal blood, that this communication takes place? This is a difficult matter to decide. On this point conjectures only can be made. However, if cases were met with in which a woman, who had no disease before her pregnancy, contracted chancres during gestation, followed by constitutional infection which became transmitted to her infant, it must be admitted that it is by the materials furnished to the fœtus for its nutrition that the transmission has taken place. These facts require most careful observation.

But from the instant that *secondary syphilitic* symptoms give place to the *tertiary* symptoms, the hereditary transmission ceases entirely or nearly so. Such at least is the result of the observations of M. Deville, who is in possession of a great number of facts in which the patients were observed to miscarry, to give birth to still-born children, or to infected ones, during the whole time that the period of the secondary symptoms lasted; but from the time that the tertiary symptoms made their appearance, the same patients, having again become pregnant, gave birth to healthy children. It is, then, probably a valuable element in diagnosis, to determine if a patient infected with constitutional syphilis is in the stage of secondary symptoms or in that of tertiary symptoms. It is well understood that if a patient affected with secondary constitutional syphilis undergoes a proper mercurial treatment, the syphilis is no longer transmitted. All that has been previously stated relates to patients who have not been treated while they were under the influence of syphilis.

Does a mother affected with tertiary syphilis (tertiary ulcerations, coryza, ozæna, sub-cutaneous nodes, periostial swellings, exostoses, &c.)

give birth to scrofulous children? No positive observation has yet been produced in support of this opinion, which is not absolutely an improbable one. But we know not what to think of this syphilitic origin of scrofula, when we see the persons who admit it cite in its support cases of the so-called transmission by parents who have had simple blennorrhagia, or by a mother who has had a simple ulceration of the neck of the uterus.

A question still undecided is that of ascertaining if a nurse or a mother suckling her child, and contracting syphilis, may transmit this disease by lactation. M. Ricord believes not; and, in fact, we meet with more cases against the transmission than there are in its favour. It must, nevertheless, be admitted that the question requires to be studied over again, for certain facts appear to favour the possibility of this transmission. Many difficulties occur in cases of this nature, but it is very astonishing to observe practitioners still allowing themselves to be deceived in certain cases by the nurses. In many cases syphilis is transmitted to children by nurses in the following manner, which it is right to remember. The nurse has chancres, the pus of these chancres inoculates the child; the child at first has a chancre (primary phenomenon), and then, in consequence of this chancre, but neither always nor inevitably, it has secondary syphilitic symptoms. The converse may take place, that is to say, the transmission may take place from the child to the nurse; for, besides the possible fact of a transmission by lactation, there is yet this circumstance, that children tainted with secondary symptoms may infect their nurse by originating around the nipples, to which their mouth is continually applied, a specific ulcerous inflammation, which often causes the loss of the nipple, and which soon determines other syphilitic symptoms. Practitioners should be fully alive to these facts in medico-legal cases.

It was for a long time maintained that a child tainted from its birth with secondary syphilis, having no primary symptom, could not transmit that disease to its nurse. This is a mistake; and by attentive observation, the mind being free from every preconceived idea, it will be found that this may occur. I have seen several cases, and I am not the only one who has observed the like. I have seen children tainted with secondary syphilis transmit to their nurse, through the medium of fissures of the nipple, ulcerous inflammations causing loss of the end of the breast, and followed by sore throat, mucous tubercles, and syphilitic eruptions, &c. There are instances of children who have thus infected several nurses successively, and in which the other child, the foster brother or sister, has also contracted the disease. These facts are sufficiently numerous to engage attention, and if all are not equally explicit, there are sufficient of them to convince those not interested in this debate. Many of these cases will be found at the end of this work, in the

chapter specially appropriated to syphilis and to the transmission of this disease in the infant to the nurse.

[De Hery remarks that among other modes of communicating secondary syphilis, irreparable mischief is inflicted by tainted nurses infecting their foster children. A wet nurse, being thus disordered, but bearing no external evidence of her disease, is engaged to assist the natural mother, whose supply of milk is insufficient for the requirements of her offspring. The seeds of the malady are thus transmitted from the wet nurse to the infant, from the infant to its mother, and from the mother to her husband. Such kind of defilement may ensue upon casual contact of a sound infant with the breast of a different mother having the disease, and the evil may be accomplished by a single application.—*Methode Curatoire;* Paris, 1552; p. 19.

Wiseman also has remarked, that "Nurses may either infect children, or be infected by them."—*Chirurgical Treatises;* book vii, p. 4; 1676.

Whitehead (on *Hereditary Diseases;* chap. ii; 1851) gives several instances of syphilitic infection through the medium of the breath—of these, five were from the mother to the infant, in none of which was the nipple or adjacent parts excoriated—and one from the infant to its mother. In one case, the husband contracted a gonorrhœa during the fourth child-bed confinement of his wife, and communicated the infection, believing himself cured, after the term of her convalescence. The first symptoms in the wife were, vaginal discharge, irritable bladder, and flat tubercular eruptions about the vulva. At a later period, she had roseolous eruptions on the skin and iritis; and at this time the infant began to have eruptions, with sore mouth, husky voice, obstructed nasal breathing, &c., but it continued at the breast, without inconvenience to its mother, the usual length of time, and died, emaciated, at the age of sixteen months. The poison continued its ravages upon the system of the mother about fourteen years, and ended in malignant degeneration of the uterus, which had a fatal issue. During the period in question, the lives of ten children, born at the full term of gestation, besides an abortive pregnancy, fell an early sacrifice to the disease transmitted from their parent. In another case, the father was treated for primary syphilis when the infant was ten months old, who, as well as its mother, was then in perfect health. He appeared to be completely cured at the end of about two months, during which period, and for a length of time afterwards, no reinfection, on account of certain circumstances which existed, could possibly have taken place. Moreover, the symptoms which afterwards appeared in the wife, bore no evidence of a primary nature. The syphilitic affection appeared in the child befere any such manifestation was noticed in its mother, excepting purulent leucorrhœa. At fifteen months old, while still at the breast, the child had a crop of scaly blotches on the face and forehead, the nates, thighs, and abdomen, with sore mouth, noisy breathings, bad complexion, which symptoms were greatly ameliorated by the use of hydrarg. c. cretâ; at the age of fifteen months the child, who, in consequence of her indisposition and apparent inability to swallow a more solid diet, was still fed at the breast, had another necession of eruptions, more abundant and lasting than the preceding one. The throat, externally, was perceptibly swollen; the mouth inflamed and excoriated; the lips were cracked and angry; the eyes tender; the voice was husky; and the nasal breathing greatly incommoded. The cutaneous blotches were most numerous on the nates and face; more scattered on the extremities; still more distant on the body, except the upper and fore part of the chest. A yellow purulent secretion (blenorrhœa) escaped from the vagina, of which the labia were swollen and irritable; the anus was surrounded by a broad areola of papulous erythema.

There was tumidity of the abdomen, and dropsy of the ankles and feet. These symptoms were not recent; they had existed several weeks; in addition, one or two lymphatic glands of the parotid region on one side of the neck, previous enlarged, began to inflame, and in a short time terminated in abscess, whence escaped a considerable quantity of flocculent and very offensive pus. The child died at the age of twenty months. The only means of accounting for the origin of the child's decease, was, by imbibition through the medium of the lacteal current.

In another case, the mother contracted primary syphilis from her husband, six weeks after her sixth delivery. All her previous children were healthy. The infant, also in health up to the date of its mother's accident, was covered with secondary syphilitic eruptions, and other symptoms, at three months old, several weeks before any secondary indications manifested themselves in its mother; and in a very similar instance, the mother contracted a primary affection from her husband, one month after her second delivery, the child and she being at the time in good health. Secondary symptoms, of characteristic form and of considerable severity, made their appearance in the infant a length of time before the complaint had assumed the secondary type in its mother.

In another instance, the primary affection, a gonorrhœa without complication, first appeared in the father; it then showed itself, under a severe form, in the mother, who was actively treated, and considered cured in a few weeks; but the purulent discharge, with other inconveniencies, did not cease. She continued to suffer, acutely, from vaginitis, which was occasionally mitigated by local means, and as often returned; this, and the uterine disease already described—both resulting, doubtless, from the gonorrhœal infection—were finally cured by local and general treatment, after having existed several years. When the infant was three months old, six weeks after the reception of the poison by the mother, it had a violent attack of purulent ophthalmia, considered to be owing to imbibition of the poison through the breast milk. After the cure of this, as the child appeared plump and thriving, it was believed the taint had been eradicated. But, when twelve months old, on being weaned from the breast, the little patient had a violent attack of secondary syphilis, which resisted the simple measures first adopted, and was finally subdued by mercury. A tubercular eruption, occupying the back principally, with glandular swellings about the neck and throat, have continued to trouble him from that period until now—a space of fifteen years.

In another interesting case, a midwife became infected by digital inoculation, suckled her child fourteen weeks, which, at the age of six months, was pale, fretful, and manifestly out of health. There was a chancrous-looking ulcer under the tip of its tongue, and the rest of the mouth and throat was inflamed. It had hoarse voice, obstructed nose, and soreness of the anus, which was surrounded by an areola of erythema, the symptoms being evidently syphilitic. Hydrarg. c. cretâ was administered with complete success.—P.H.B.]

The period at which syphilitic symptoms show themselves in a child who has received the germ of it by hereditary transmission, is almost invariably from the first to the second month of extra uterine existence; nothing is therefore more common than to see syphilitic mothers giving birth to children who are at first apparently healthy, but, at the end of a month or six weeks, these infants are attacked with the syphilitic symptoms to which we are about to refer. Some persons maintain that they have seen syphilitic symptoms show themselves in

infants at the eighth day after birth. This fact stands in need of confirmation, for nothing, in the present state of science, authorizes us to believe in its truth. In order to arrive at a correct judgment on these cases of hereditary syphilis it must, moreover, be remembered that many practitioners erroneously confound several of the eruptions which appear in young children with syphilitic eruptions, of which, however, they do not possess any of the characteristics.

Can hereditary syphilis betray itself by external symptoms showing themselves on the child at the very moment of birth? This is still a disputed question. Practitioners of the highest standing, amongst whom ranks M. Ricord, believe that cases of this kind have been observed in an imperfect manner. M. Ricord, relying on this, amongst other reasons, that in the small number of cases which have been observed, the children were still-born, is rather disposed to believe that the pretended syphilitic eruptions were only the simple products of the commencing decomposition of the skin. This explanation is probably not very correct; for M. Deville has had the opportunity of observing in a still-born child well characterized and very numerous mucous tubercles, on various parts of the body. We may then state that, almost invariably, hereditary syphilis does not manifest itself by apparent symptoms until towards the fifth or sixth week after birth; but that it may, in some rare cases, produce syphilitic eruptions before the fœtus has seen light. In fact, in most of the cases of this kind observed up to the present time, the fœtus had died in the mother's womb some days before the period of delivery; but, very recently, children have been observed to be born, well formed, with evident symptoms of syphilis. M. Paul Dubois has observed several cases of syphilitic pemphigus in children who have survived. M. Gubler has also observed a case; and I have witnessed the most curious of all these instances at the Hôpital de la Pitié, in a child whose case will be reported further on under the head of syphilis.

The symptoms of hereditary syphilis are composed of mucous tubercles, which are developed on all parts of the body, but especially in the neighbourhood of the folds of the joints and the perineum. These tubercles do not present in the child any more special character than in the adult, excepting their usually small size, their extreme softness, and the abundance of purulent matter which they secrete. It is very uncommon to see ulcerations appear on the palate, or velum palati. Probably, a form of chronic coryza, which was observed in four children who had red, irregular, ulcerated tubercles on the perineum, and who were the issue of syphilitic mothers, should be referred to syphilis.

As to the general phenomena, they may be wanting; but, generally, the child is weak, loses its appetite, becomes pale and emaciated, and

soon dies in the midst of the venereal cachexia, if proper treatment is not applied to it.

Children affected with hereditary syphilis may be cured rapidly when they are treated in an appropriate manner. Some who have arrived at the last stage of marasmus, are observed to recover perfectly. But in these cases, death is much more frequently the consequence of the disease.

The treatment consists in submitting the mother to a mercurial course, whether she presents apparent symptoms of syphilis, or whether she presents none at all. Can this mercurial treatment be proposed to a healthy nurse who suckles a child tainted with syphilis? This is a more serious question than we may at first believe it to be, for it is frequently observed, though without suffiient proof, that the employment of mercury may be followed by very serious inconveniences. For my part, I hardly believe it, and I have never seen mercurial treatment properly directed followed by disastrous results. However, in submitting such a proposition to a nurse, we should carefully explain what we expect from her, so that she may decide with a full knowledge of the question. As regards the mother, we have not the same hesitation; for although we have sufficient reason to believe in the possibility of the transmission of the syphilitic symptoms by the father, yet in nearly, if not in all, the well observed cases of hereditary syphilis, the disease has been derived from the mother. Now, if the mother has, or has not, apparent symptoms, she is not the less under the influence of a syphilitic diathesis, which should be treated by mercury. If she suckles, the mercurial treatment possesses a double advantage, since, at the same time, it influences both the mother and the child.

The most proper treatment to put in force, that which M. Deville has seen employed with the greatest success, consists in administering to the nurses the proto-iodide of mercury in doses of from $\frac{1}{3}$ to $\frac{1}{2}$ a grain in the form of a pill, two or three times a day. Under the influence of this agent, although careful analyses have not succeeded in discovering any trace of it in the milk, the children rapidly recover their health, and the syphilitic symptoms disappear.

If analysis does not detect the mercury in the milk, this is no reason for believing that it does not exist there; especially if we reflect on the minute quantity which must be contained in it. For example, in the milk of nurses who take from thirty to sixty grains of iodide of potassium a day, sensible traces, it is true, but very slight ones of iodine may be detected. Since, then, an agent so easy to recognize as iodine is only discovered in small quantity, how much more difficult should it be to detect mercury, which requires a complicated manipulation for its discovery, and of which the patient can only take, comparatively, very slight doses.

As to young children affected with chronic coryza, probably syphilitic, of which we have spoken, they may be cured by means of iodine given in small doses, administered under the form of iodide of potassium. It should be given in a little water or sugared milk in the dose of from two to seven grains a day. This small quantity is not capable of producing any inconvenience. The iodine which passes into the milk of the nurse does not appear to be present in sufficient quantity to authorize us to treat the child through that medium.

2ND. ON THE INFLUENCE OF THE ACTUAL DISEASES OF NURSES.

Amongst the various local or general affections which may attack the nursing mother or the nurse, some appear to possess no influence over the health of the children; others, on the contrary, exercise the most pernicious influence over it.

Their action is *immediate* or *remote*.

Those whose effect is immediate are easily recognized, and the relation which exists between them and the symptoms which they determine may be easily established. But this is not the case with the disorders of the nurse, the influence of which is remote. Thus we may reasonably suppose that the milk of a nurse known to be affected with tubercles while suckling, may have the most pernicious consequences, but no one can affirm it in a decided manner. The same may be said as far as regards the syphilitic and scorbutic affections, and also as to the anemia which results from bad nourishment. It is probable these diseases of the nurse are more or less prejudicial to the child, but observation has not established this.

IMMEDIATE INFLUENCE OF THE DISEASES OF THE NURSE.

These diseases are rather numerous. They may be divided into three classes. In the first we shall rank those which are accompanied by a modification in the secretion of the mammary gland, that is to say, in which the milk presents alterations which are appreciable to our means of investigation. In the second must be placed those which are not accompanied by any alteration of this kind, and lastly, in the third, those the transmission of which takes place by the repeated contact of the nurse and the child. *Maxima diversa est ratio, nec raro miranda, quâ ad parvulos morbi tales transferentur. Partim nimirum* LACTE, *partim* PERSPIRATIONE, *partim* CONTACTU, *partim* SALIVA, *partim* ALIA VIA. *morbi ad eosdem transire possunt.*— Wagner.

1st CLASS. Immediate influence of the diseases of the nurse with alteration of the milk.

What has been previously stated on the alterations of the milk, here finds its application and serves to enlighten this part of the question.

1. There are women who possess all the appearances of the most robust health, and whose constitution is strong and vigorous, and who yet make but poor nurses. I have witnessed instances of this, but they are rare. M. Donné relates a very curious case which will be found in his *Cours de Microscopie*. The lady who was the subject of his observation, enjoyed good and robust health, but her child thrived badly, appeared to suffer after having sucked, and often had derangement of the bowels. M. Donné* believed he might refer these symptoms to a particular alteration of the milk—too rich—containing abundant nutritive principles—too substantial and too heavy for the stomach of the infant. In fact, the milk of this nurse contained a very great number of globules; they were so crowded that free spaces between them could hardly be observed, and they presented themselves without confusion or agglomeration throughout. It was, as M. Donné observes, the richest milk he had ever met with. After this examination the mother was persuaded to continue to suckle her child, simply taking care to interpose a greater interval between the hours of suckling, so as to give time for digestion to take place, and to diminish the consistence of the milk a little by its sojourn in the breasts. This simple precaution was sufficient to cause the disappearance of the symptoms, and the child soon regained its health.

Excess in the quality of the milk is, then, by no means desirable; its excessive richness, that is to say, the absolute increase of the amount of its solid elements in a strong and vigorous nurse, is always prejudicial. Under this influence the child is subject to frequent attacks of indigestion, which soon become the cause of inflammation of the alimentary canal.

2. Most of the affections of nurses usually determine in the milk an influence quite opposite to that we have just mentioned. They cause what is erroneously termed the impoverishment of this liquid, its serous state, the diminution of its quantity, the imperfect elaboration of its elements, especially of the globules, and its insufficiency for the requirements of nutrition. It is a remarkable circumstance, that in these cases the solid constituents of the milk are still in excess, and render this liquid heavy and indigestible, as in the preceding case. The bad quality of the milk, then, depends as much on its imperfect elaboration, as on the increase in the amount of its solid parts. It is a sort of concentration of the milk, of which fever is the cause.

Nurses whose constitution is delicate without being altered by disease; those who are in that state of ill characterized suffering which accompanies poverty and imperfect nourishment; those who are ailing,

* *Cours de microscopie*; Paris, 1844; p. 445.

and a prey to incipient organic affection—pulmonary tuberculization, for instance; those, lastly, who are attacked by an acute inflammatory affection like pneumonia, a septic one like puerperal fever, or a virulent one like syphilis; all these very frequently present this alteration of the milk. A painful sensation sometimes conduces to the same result; thus E. Siebold has met with a lady in whom the exaggerated odour of camphor disturbed and even suspended the lacteal secretion.

In these cases the milk is clear, serous, deficient in quantity, and contains a small number of milk globules, all very minute and as if reduced to dust. It is relatively more abundant in solid constituents, such as butter, caseum, and sugar, which render it heavy and dangerous to children. This is what is termed a poor milk; an incorrect expression, which should be replaced by that of a concentrated milk.

The diseases of the nurse which determine this concentration of the elements of the milk and this imperfect elaboration are, as we have seen, very varied and dissimilar. Their usual result is to cause in the child irritation of the alimentary canal, diarrhœa, colic, vomitings, thrush, &c. The concentration of the milk which results from disease and fever, like its excessive richness in the normal state, appears to be the cause of the same symptoms in the nurslings.

3. The diseases to which we have just alluded, and moreover certain local affections, such as congestion and inflammation of the breast, and pregnancy even, which determines the impoverishment of the milk of the nurse, become the cause of an alteration of this liquid and of its return to the state of colostrum. We also here find a similar alteration corresponding to diseases differing much in their nature.

In these varied circumstances, in the course of pregnancy, in the midst of the fever which accompanies inflammation of the breast, and in the fever of pneumonia, enteritis, &c., the milk diminished in quantity, and concentrated in its solid constituents, presents under the microscope small, ill-defined milk globules, confused and as if reduced into dust, in the midst of which a large number of those granular bodies peculiar to the colostrum are observed.

The influence of this milk on the children is further evinced by irritation of the alimentary canal, by colic, by vomiting, by diarrhœa, &c. Nevertheless these phenomena are not constant. We still see children who are suckled by a diseased nurse, whose milk contains the elements of the colostrum, and which do not present symptoms of this nature.

Thus, I will cite a case of a woman at the Necker Hospital. She had slight puerperal fever and multiple abscesses in the subcutaneous cellular tissue of the limbs; her milk was poor and contained numerous granular bodies. The child, who took no other food,

continued in tolerable health, without suffering from diarrhœa, until, in consequence of epidemic causes, a catarrhal affection of the bronchi made its appearance.

I have also observed a considerable number of nurses become pregnant who continued the lactation in spite of the alteration of their milk, and its return to the state of colostrum. Their nurslings did not appear to suffer from it. Nevertheless, in the majority of cases, the milk secreted in pregnancy is of bad quality, and gives rise to a more or less considerable irritation of the alimentary canal of children.

4. Congestion and inflammation of the breast are sometimes the causes of an alteration of the milk which differs from the preceding, and which may prove very prejudicial to the child. I refer to the contamination of this liquid with pus.

Abscesses of the breast formed in the very tissue of the mammary gland often destroy some glandular lobules, and *lay open* the lactiferous conduits. These ducts thus remain gaping in the midst of the abscess, incessantly absorbing the pus contained in its interior, and carrying it outwards through the orifices of the breast, where it mixes with the milk derived from the other portions of the gland.

The microscope very readily detects this alteration of the milk which was first pointed out by M. Donné, who relates several examples of it in his work. Its existence has been very frequently verified since that period, and it is impossible not to accept it as an incontestible fact.

It is almost unnecessary to observe that such a disease of the nurse may exercise the most pernicious influence over the health of the child. The symptoms which thence result are at present undetermined, they appear to be concentrated on the mucous membrane of the alimentary canal. Thus digestion becomes disturbed, the child vomits and has diarrhœa. However, in cases very nearly similar, in women whose breast was the seat of an inflammatory and phlegmonous process, M. Dubois has seen erysipelas and gangrenous abscesses make their appearance in the child, especially in the scrotum, which have rapidly terminated in death. It is true that in these women no microscopical analysis of the milk was made, and it cannot be stated that it contained pus, which is, however, exceedingly probable. However this may be, it remains proved that the milk proceeding from an inflamed breast, whether it contains pus or whether it does not, is excessively prejudicial to children.*

5. Lastly, we must refer to a particular state of some females, in which the milk flows mixed with a certain quantity of blood. This phenomenon, a very extraordinary one, if there be no mistake in its interpretation, which it is impossible to believe, has never been yet met with in women. M. Donné has occasionally met with it in animals.

* Donné, *Cours de microscopie.*

This physician has discovered in the reddish milk of two asses a certain number of blood globules, recognizable by their form and by their colour, soluble in ammonia, placed in the midst of the milk globules.

This alteration is not met with in women; and, in the case in which it was believed to be observed, this blood was not formed simultaneously with the milk in the interior of the breast, it proceeded from the exterior, and from a fissure of the nipple.

But the accidental mixture of blood and milk, so frequently in fissure of the nipple, must not be confounded with the natural mixture which would be the result of the alteration of the secretion of the liquid. One of these phenomena is purely local and without effect on the health of the child; the other on the contrary, is allied to a general disposition of the nurse which is assuredly very serious, but the character of which we cannot precisely determine, since it has not been observed in the human species.

From the preceding considerations, it results that the diseases of the nurse, accompanied by an alteration of the milk, appreciable to our means of investigation, have not an *immediate* action, particular and special to *each of them*, over the health of children. In the child, all these affections have for a common result the insufficiency of nutrition, followed by the irritation of the alimentary canal, characterized by colic, vomiting, and diarrhœa. Although they may be accompanied by the alteration of the milk, described under the terms of *richness* or of *concentration*, caused by its alteration and by the elements of the colostrum, sometimes by pus, their effect is not less the same. *The symptoms which are developed are always seated in the alimentary canal, and their nature is always similar.*

Thus, then, the vigour of the constitution and the normal individual modification, which are in relation with the rich and copious secretion of a milk too abundant in solid principles, are included in the same category as the diseases which determine the impoverishment and the concentration of this liquid, in regard to the influence of these general dispositions of the nurse on the health of the children. The same is the case with inflammatory diseases, with pleurisy, pneumonia, &c. Their immediate influence is similar to that of the septic diseases, as puerperal and typhus fever.

Moreover, if the diseases referred to, exercise a pernicious influence over the secretion of the milk, it must not be believed that they will invariably disorder the health of the children; very often indeed, the nursling experiences no injury from sucking the nurse who is ill. Thus, I have seen women attacked with acute articular rheumatism, incapable of holding their child themselves which was presented to their breast; others who were affected with pneumonia, with phthisis, with puerperal fever, with typhoid fever, &c., with or without any alteration of the

milk, who did not cease to suckle their child, which did not appear to suffer from it.

There are great individual differences in this respect. A child may suffer under the influence of its nurse's milk, probably in a manner quite different from another which might be in its place. A woman came under my notice who menstruated during lactation, and suckled at the same time her own child and a strange child; the latter was indisposed at each menstrual epoch, had colic and diarrhœa; the former experienced nothing of the kind.

With these facts before us, which are so often contradictory, and of a nature to shake the conviction which should be entertained on the subject of the influence of nurses on their children, what is to be done and on what shall we decide? We must act with prudence, and when a nurse is indisposed, it is best to wait and observe what takes place in the nursling. If serious symptoms on the part of the alimentary canal appear, lactation should be suspended until further orders, and the child confided to a fresh nurse, if the state of the former does not rapidly improve.

2ND CLASS. Immediate influence of diseases of the nurse, without alteration of her milk.

This denial conceals our ignorance. It is evident that if a nurse, whose milk presents no appreciable modification, is capable of producing bad symptoms in the nursling, it is certain her milk is altered in a way that we are not able to detect.

In fact the milk is the necessary intermedium of this morbid influence.

It is impossible to deny the existence of indiscernible alterations of this fluid, when we can ourselves determine them at will, by the introduction of medicinal substances into the economy. The dose of $\frac{1}{4}$ to $\frac{1}{2}$ a grain of the proto-iodide of mercury, administered every day to the nurse, suffices to cure syphilis in the child, although we have never been able, by the most minute analysis, to succeed in detecting traces of this substance in the milk.

Consequently, if we can modify the qualities of the milk, without being able to perceive it otherwise than by the physiological and therapeutical results, there is reason to believe in the existence of unknown and inappreciable alterations of this liquid, when they are demonstrated to us by a phenomenon as certain as the disease of the child, supervening at the time of derangement in the health of the nurse.

However this may be as regards those indescribable alterations of the milk, which exist in nurses who are a prey to moral or nervous affections, or in women whose constitution is subject to a certain cachexia, scrofulous, or syphilitic—what concerns us is, to determine which amongst these morbid dispositions are immediately prejudicial to children.

Moral affections, and the nervous agitation of nurses, have sometimes the greatest influence over the nutrition of children; but this influence is far from being constant, and should be considered, in my opinion, as being quite exceptional.

The mother and the nurse who are not attached to their nursling make indifferent nurses; their milk does not flow with abundance, as in mothers devoted to their child; they do not experience the internal commotion known under the term of the *draught of the milk*, and which takes place at the sight, or at the thought alone, of those to whom they may soon give suck. The child suffers, and its development is retarded—fortunate, indeed, if it does not fall ill. These are the results of the indifference and of the weariness which may be felt in fulfilling the duties of nurse.

Emotions of all kinds, violent anger, deep grief, and, in general, all the passions, rapidly change the composition of the milk, and may render it immediately injurious to children. Thus, a nurse, while yet alarmed at the danger her husband had just experienced in a quarrel with a soldier who had drawn his sabre against him, and from whom she had snatched this weapon, gave her breast to her child, eleven months old, and in good health; the child took it—soon quitted it convulsed—and died in a few minutes.* The case related by Deyeux and Parmentier of a lady subject to nervous attacks, who, on these occasions, observed her milk altered and viscous like the white of an egg, is well known. It is not stated what was the result of this nourishment on the child, but it may be supposed that lactation had been interrupted, for a milk of this composition could not be otherwise than dangerous.

These sudden alterations of the milk, which are frequently inappreciable, and the nature of which is unknown—often determine convulsions.

Thus, I have seen a very nervous lady, much agitated in the hot season by the electrical condition of the atmosphere, and especially by a storm, who could not give the breast to her child without almost immediately communicating to it a considerable agitation, which several times amounted to convulsive spasm. She thought it prudent to suspend the lactation when she found herself in such a state, and the symptoms were no longer observed in the child.

It is related that a very lascivious young woman observed the child which she suckled fall into violent convulsive movements each time she gave herself up to coitus. This fact appears to justify the aphorism of Galen: *A Venere omnino abstinere jubeo omnes mulieres quae pueros lactant.* But numerous examples, on the other hand, tend to demonstrate that the influence of venereal pleasures is not always

* *Ann. de litt. medic. Britan.*; and Guérard, *Dictionnaire de médecine*; *art.* LAIT.

so injurious. *Numerosissimas vidi mulieres, quae singulis fere annis feliciter pariebant, licet ubera praeberent infantibus.*—Van-Swieten. There are, moreover, practitioners who go much further, and who even recommend, for the sake of the nurse, to grant her the satisfaction of seeing her husband. *Certum est occulta desideria pejora et magis noxia esse, quam plena honestarum fœminarum gaudia, et rarum moderatumque Veneris usum.*—Platner. We cannot irrevocably decide this question from certain particular facts, without running the risk of falling into error. Sexual congress can only be immediately dangerous in some nurses whose excitement is extreme, and whose senses are exceedingly impressionable. But what should absolutely forbid it is, that pregnancy, which is not perceived until some time after, is often the result of it, and that, as we have seen, the state of the milk which usually accompanies this condition, being frequently injurious to the nurslings, we are obliged to confide them to another nurse.

The premature reappearance of the menses is a phenomenon which gives mothers much uneasiness. A great influence over the health of children was formerly attributed to it; but this is not generally the case. It is a question which cannot be decided *à priori* for all women, and which should be decided by the observation of each of them.

Thus, I have asked nurses many questions on this subject, to discover if they had their monthly periods in the antecedent lactations, and if their child appeared to suffer from it. I have, on the other hand, observed a great number of nurses who had the premature return of the menses, and I have arrived at these results: 1st. That the menses reappear in one third of the women between the fifth and seventh month of lactation. 2nd. That frequently the women have only their menses once, which indicates aptitude for conception; they then become pregnant, and the menses do not appear again. 3rd. That the generality of children do not appear to suffer from this state of the nurse. 4th. There are some who at this time have colic, slight restlessness, and sometimes a mild diarrhœa. 5th. That others, and these are rare, are very ill some days before, during and for a short time after the menstruation of the nurse, who must necessarily be replaced. The symptoms are seated in the alimentary canal, and colic, vomiting, diarrhœa, and sometimes a considerable fever are observed to make their appearance. 6th. That the milk in these circumstances does not present appreciable changes to our means of investigation.

Sœmmerring relates a very curious instance which, if it were more frequent, would appear to demonstrate the impossibility of opposing the desire of nature with regard to lactation by the mother. The milk of a woman who suckled her own children without inconvenience produced convulsions in other children.—Andral, *Leçons Orales.* This fact will not assuredly destroy the habit so readily acquired of trusting children

to wet nurses, but it may at least teach us that it is not an indifferent matter to confide them to the first woman who presents herself. In fact, nurses possess, with their individuality of race, constitution, and temperament, an individuality of milk, the qualities of which are more or less advantageous to the health of the children, according to the women who furnish it.

Nurses are sometimes attacked by inflammatory or septic diseases, which are not accompanied by the changes in the milk mentioned in the preceding chapter. In this case these diseases have no influence over the health of the children, which is then only accidentally disturbed. Thus I have seen pneumonia attack a child which had not ceased to suck its mother, who was labouring under a violent attack of erysipelas of the face, with delirium, and whose milk was not altered. I have witnessed a similar circumstance in another child, whose mother had a slight puerperal fever; but, in contradistinction, I may cite a third case much more singular, in which a woman labouring under puerperal arthritis of the knee, tolerably well in other respects, and without very intense febrile reaction, continued to give the breast to a child who had suppurating arthritis of the right shoulder, which was confirmed by the autopsy. At the time this occurred I had not thought of studying the alterations of the milk, and I did not examine that of this nurse, so that I am unable to state if this fact is well placed in this chapter. However, I have considered it right to mention it, for it may be presumed that the examination of the milk would not have accounted for the formation of a simultaneous arthritis in the mother and in the child.

Certain diseases of the skin in the mother or in the nurse become transmitted to the child by direct contact. Of this there is no doubt, but it is difficult to determine if the the transmission is effected by means of the milk. This is not probable, for I have seen many women who had non-specific cutaneous affections, and who did not transmit any disease to their child. I have only observed the contrary phenomenon once, which must be explained as a simple coincidence until other and similar facts permit us to deduce different conclusions. The nurse referred to had eczema of the breast for many years, which she could not get rid of, and which developed itself all over the body of her child when four months old.

Lastly, we arrive at a very important class of the diseases of nurses, the immediate influence of which, on children, is far from being determined. I refer to the influence of constitutions and of certain cachexiæ in which the milk presents no alteration. Scarcely any examples have been observed of children who have been suckled by nurses of scrofulous, scorbutic, or syphilitic constitution becoming affected with symptoms depending on these various morbid states. The existence of these symptoms as the results of the constitutional state of the nurse may

even be denied; they should only be received as coincidences. In fact, if we carefully observe children of good race, suckled by a woman of scrofulous temperament, even very marked, we neither find in the external condition, nor in the health, phenomena which can lead to the belief that it is scrofulous. If the lactation should have any influence, it will be only perceived at a later period.

As to syphilis, no fact demonstrates in a decided manner its transmission by lactation. *Constat hodie fere inter omnes, virus venereum neutiquam per lac ad infantes transferri.*—Wagner. We may believe in this transmission, but it will be difficult to furnish any satisfactory proofs of it. At first the milk of syphilitic women does not present characters different from the milk of women in good health (Donné); if it is altered it would be by a virus, of which not even one has yet been detected. Lastly, if we carefully examine the cases of syphilis which have been attributed, or which we feel disposed to attribute to infection by the milk, it will be seen that this is not the case, and that the mode of propagation is entirely different. In fact, we almost invariably discover in the nurse a chancre, the pus of which, transferred by the hands, by the linen, and by *repeated contact*, has finally been absorbed, and produced in the mouth and on the body a similar chancre, the origin of the venereal disease.

In these cases there is a true inoculation of which the chancre is the primary phenomenon, and is at the same time, the cause of the secondary symptoms. It is generally in this way that the transmission of syphilis to children takes place.

The influence of the spyhilitic cachexia is not then immediate, for syphilis does not appear to be transmitted by lactation; it may, on the contrary, exert a more remote influence, and it is not impossible that it has an intimate relation with the development of scrofulous disease.

To sum up, then, it is observed that certain dispositions of the mind, moral affections, passions, and some diseases of the nurse which are not accompanied by a modification of the milk, sometimes exert an immediate and grave influence on the health of the children.

This influence is even in general more injurious than the influence of diseases with alteration of the milk. All children are not affected by it with the same facility; there are some even who do not feel it.

The want of affection of certain mothers for their children, the extreme distaste they have for the duties of lactation, are prejudicial to the physical development of the nurslings.

Fear, anger, continual anxiety, very deep grief, are sometimes the cause of very considerable derangements on the part of the alimentary canal and especially of the nervous system. The latter are especially observed in the midst of violent passions, and particularly under

the influence of venereal pleasures. Convulsions in the children are the most usual manifestation of this state in nurses.

Menstruation is sometimes the cause of colic, vomiting, and diarrhœa; but these phenomena are rare.

The state of the constitution, the temperaments, and cachexiæ, do not appear to possess any immediate influence over the health of the children. If these diseases possess any action, it can only be a very remote one.

3RD CLASS. Immediate influence of diseases of the nurse in consequence of contact with the child.

We have just studied the action of certain diseases of the nurse on the child, whether there be an appreciable alteration of the milk, or, on the contrary, whether this liquid presents nothing particular. But other diseases of the nurse may be communicated to the child *by infection or by contact*, and here it is no longer in her exclusive quality as nurse, that she transmits a certain disease, it is by the same mode as any strange person would do who might carry the germ of this identical disease. We shall not insist further on this point: we shall simply state that in this manner, scabies, ophthalmia, diphtheritis, small-pox, cholera, and, according to my observations, primary syphilis, and the disposition to erysipelas in cases of puerperal fever, &c., may be transmitted. In all these cases lactation should be interrupted and another nurse obtained.

REMOTE INFLUENCE OF MORAL AND PHYSICAL AFFECTIONS OF THE NURSE OVER THE HEALTH OF THE CHILDREN.

This influence is much more difficult to determine than those which, up to the present time, have fallen under our consideration. We have nothing to observe, in this respect, which has not been pointed out by all authors. It will be readily understood that my researches on this subject are limited, for they require a practice and an experience which few persons can possess, and the acquisition of which the short duration of human existence prevents. In fact, however extensive the practice of a medical man may be, he will never have a sufficiency of patients whom he has had under notice from birth to an advanced age, to form a firm and sufficiently decided conviction on the subject under consideration. The most he can do is to express his doubts; if he be prudent, he will not go further.

A very evident remote influence over the constitution and the character of the children was formerly attributed to the milk. Thus, it was believed that children nourished with cow's milk were more indolent and less cheerful than those who had been brought up with goat's milk.

It was also admitted that the character and the passions of the

nurse may be transmitted to the child by the milk. Sylvius has formally declared it.* But, as Desormeaux observes, if it is true that the nature of the milk, which depends on the physical and moral constitutions of the nurse, exercises an immediate influence over the health and the constitution of the nursling, so as to modify its intellectual and moral development, it is not correct to maintain that it possesses a remote influence over the character of the individual, for too many facts prove the contrary. When this transmission takes place, the child receives it much more surely from imitation of the manners of its nurse, and from the education she has given it.

We must now consider the remote influence of certain diseases of nurses over the future health of children, and learn what is the ulterior action of the milk of women labouring under nervous affections, epilepsy in particular; or a syphilitic, cancerous, scorbutic, and scrofulous cachexia, and especially pulmonary phthisis. Unfortunately we possess no facts which decide these questions. It is truly by chance that a woman thus diseased is taken to serve as nurse, and it is impossible for us to hazard an opinion on this point. However, if some of these affections of the nurse, and not of the mother, do not appear to us to possess a very evident influence on the future state of the children, ignorant as we are on this point, we must at least regard them as possessing a very prejudicial influence, and change the nurse as soon as their existence is recognized.

On changing the Nurse.

The considerations relating to the influence of the constitution, and the antecedent and actual diseases of the nurse on the health of the children, here find their application. There is only one means of remedying the inconveniences and dangers which may result from the bad disposition of nurses; they should be replaced by others in a better state of health.

When should the nurse be changed, and how should it be done? These are questions which the practitioner is often called upon to decide.

We have already spoken of the choice of a nurse; consequently we shall only here occupy ourselves with the circumstances which may necessitate such a change. If, on the one hand, what has been stated on the influence experienced by the child in the course of the diseases and the indispositions of its nurse, is borne in mind, and on the other the rather numerous contradictory facts which combat this influence, it will be seen that it is not possible to determine precisely the cases in which the nurse should be discharged, and the diseases which necessitate it. All depends on the observation

* *Tract de morb. infant.*, ch. xlii.

of the patients; for an indisposition or a disease of the nurse, which is fatal to one child, may not be so dangerous to another. This is what I have observed in women, menstruating at the sixth, seventh, and eighth months of lactation, who, together with their own child, suckled a strange infant. At the time of menstruation, one of them experienced colic and diarrhœa, the other had nothing of the kind. It is not impossible that the same may hold good as regards the influence of a certain number of the affections of the nurse.

Consequently, when a nurse falls ill, or when she perceives her menses return prematurely, she should not be too hastily replaced. It is necessary to wait a little, so as to ascertain the nature of the evil, its influence over the composition of the milk, and its action on the health of the child. It is then necessary to decide. Till then, we must be contented in giving the child the breast less frequently, and in supplying its wants by the feeding bottle, filled with good cow's milk, and by thin light soups if the child is old enough to take them.

When the disease of the nurse is a serious one, and threatens to prolong itself; when its nature is unfavourable; when the milk is altered; and, lastly, when the child presents gastric disturbance or has other sufficiently serious symptoms, so as to make it appear likely that it may become more decidedly indisposed, we should no longer hesitate; the change of the nurse is indispensable to the health of the child.

All these precautions are necessary, so as not to discharge, without good reason, a nurse who knows the habits of the nursling, and with whom we are satisfied in every other respect. This change does not of itself present any danger, and having lost the first nurse, we may, as I have had occasion to do, successively engage two or three others, until we met with a very suitable one.

When the nurse is to be replaced, we should, as M. Donné recommends, keep her in ignorance of this determination, and before acquainting her with it, wait until the new choice has been made. Then it is well not to interpose any interval between discharging and replacing her; so that she cannot cause the child to suffer in any way from the anger which this proceeding may excite in her.

On the influence of Diseases of the Child on the Nurse.

If the newly-born infant can receive, from a wet nurse, the germ of various contagious diseases, it can also, by reciprocity, transmit to her some of the diseases which afflict it. Accidents of this nature are relatively more rare, but they still exist in considerable number. Only, in this case, lactation has nothing to do with their manifestation. The transmission of the diseases of the child to the nurse takes place in virtue of ordinary pathogenic laws of the adult:

this transmission is more direct than that which is derived from the nurse to the infant, since the milk has no longer any influence here; it is the result either of *infection* or of *contagion*.

It is by contact that scabies, favus, thrush, ophthalmia, and hereditary constitutional syphilis may be transferred from the child to the nurse; but it is generally by infection that small-pox, chicken-pox, measles, scarlatina, cholera, diphtheritis, &c., become transmitted from the newly-born to those who are charged with nursing them. There is little difference of opinion in this respect: the only disagreement being as to the number of diseases to be included in the category; the principle of the transmission is everywhere admitted.

Amongst the diseases of the child, which I consider as transmissible to the nurse, there is one upon which all are not agreed; this is constitutional hereditary syphilis. This is a question which as much concerns hygiene and legal medicine, as the medicine of infants: it is necessary to come to a conclusion upon this subject, with reference to the hired nurses who are procured in offices, so as to indemnify them for having been really infected by syphilis through the medium of their nursling.

Our most ancient writers on syphilis have already pointed out the possibility of this mode of infection of the nurse by children, but the question is not resolved in the same manner in the mind of all practitioners; and as I shall treat this subject more fully further on, under the article *Syphilis*, I shall avoid discussing it in this place.

APHORISMS.

1. Man should be submitted from the cradle to the laws of hygiene, so as to strengthen his constitution if it is good, and in order to improve it if it is bad.

2. Scrofulous, syphilitic, and gouty dispositions hereditarily transmitted should be treated in early infancy.

3. A man of tainted blood should never aspire to the happiness of having children.

4. A woman who becomes pregnant, owes to the world and to God the renunciation of habits, exercises, and hardships which may disturb the conception, if she wishes to give birth to a well formed child.

5. Bleeding is favourable to gestation, but it should be rendered absolutely necessary by symptoms of local or general plethora.

6. The rejection of an unreasonable caprice in a pregnant woman can have no influence over the health of her child.

7. A woman may and should suckle her child when she is in good health, and when she has no relations (direct or collateral) affected with scrofula, phthisis, or cancer.

8. There are women who are of a good constitution and yet who

cannot suckle, for their milk is scanty, imperfectly elaborated, and becomes dried up in consequence of the slightest painful impression.

9. A woman whose mammary secretion is very active before her confinement almost always makes a good nurse.

10. *A mother who intends to suckle may commence six or eight hours after her delivery.

11. A woman who nurses should give the breast every two hours at least, every hour at most.

12. Between eleven o'clock in the evening and six in the morning a good nurse only suckles the child once.

13. It is dangerous to take as a hired nurse a primiparous woman, who is necessarily inexperienced.

14. A good nurse should be from twenty to thirty-five years old, and should have brown hair, pink gums, a round figure, the breast well formed, rather hard, and marbled with blue veins.

15. A nurse should have no recent or old blemish of syphilis or scrofula.

16. The milk—yellowish during the first months after delivery, white, or bluish a little later—is an alkaline emulsion, composed of water and of solid constituents in solution or in suspension.

17. The butter is only suspended in the milk.

18. The other principles of the milk are in solution in this liquid.

19. To be profitable the milk should be abundant.

20. The milk should contain numerous globules, rather large and well formed; for small globules, resembling grains of dust, are a sign of its imperfect elaboration and its insufficiency.

21. Too many or too few globules are equally prejudicial.

22. The milk varies in its composition according to idiosyncrasies, temperament, constitution, the time elapsed since delivery, the period of the last repast, the regimen of the nurse, the action of the genital organs, &c.; but the differences are not sufficiently great to establish a law. The child prospers, therefore the milk is good.

23. The milk is altered in its composition by the febrile state, and by acute or chronic diseases.

24. Fever diminishes the quantity of milk, and concentrates its solid constituents in a less proportion of water.

25. The same is the case in different degrees in all acute diseases and in many chronic affections.

26. The milk is sometimes mixed with pus in cases of abscess of the breast.

27. The influence of diseases *on the composition of the milk* possesses nothing special and specific, for all act in the same manner. The influence of diseases is the same as that of fever.

28. A milk too rich, too much charged with solid elements in a healthy nurse, is indigestible and causes diarrhœa.

29. The milk altered, *reduced and concentrated* by fever or by disease, also causes diarrhœa.

30. A milk altered in its composition by fever or by disease, has not always a prejudicial action on the health of children.

31. Whatever may be the cause of the alteration in the composition of the milk, the result is always the same to the children; the symptoms which become developed are always seated in the alimentary canal, and diarrhœa is always the consequence of it.

32. The milk which does not present any appreciable alteration by chemical analysis, may be altered in an intimate manner in its elaboration, so as to constitute an injurious aliment.

33. Spasm, or instantaneous convulsion, usually result from the perturbation occasioned in the secretion of the milk by moral affections, acute emotions, and the agreeable or painful impressions experienced by the nurse.

34. The moral affections suddenly dry up the secretion of milk, or only modify in a decided manner the proportion of its solid constituents.

35. The happiness which a woman experiences in fulfilling her duties of nurse, is the cause of the internal trepidation which announces the flow of milk at the time she is about to give the breast.

36. The premature reappearance of the menses in a nurse slightly modifies the chemical composition of the milk, and is injurious to its elaboration; but if the child does not appear to suffer from it, which often happens, the nurse should not be discharged.

37. A nurse should abstain from venereal pleasures when she experiences a profound emotion from them.

38. A nurse should abstain from venereal pleasures for fear of a fresh impregnation, which might alter the milk in its quantity and in its qualities, so as to render it injurious to the nursling.

39. The change of nurse has no inconvenience if a bad one can be replaced by a better.

40. The nurse should be changed as often as it is necessary.

41. Lactation by the mother, or by the nurse, may be replaced by means of artificial lactation.

42. Lactation by the feeding bottle is much less successful than maternal lactation.

43. Lactation by the feeding bottle, when well directed, often gives very good results.

44. Artificial lactation should be accomplished in the first months of existence by a feeding bottle filled with tepid cow's milk, diluted with barley water, gruel, or chicken broth; and, later, by means of cow's milk without any admixture.

45. A child only requires milk in the first few months of its existence.

46. A child should begin to take thin broths when six months old.

47. Fatty food is hardly suitable until towards the end of the first year.

48. It sometimes becomes necessary to wean children before the natural term.

49. The period for weaning should be fixed between twelve and twenty months.

50. In weaning children, one of the periods of repose in dentition should be chosen, and advantage should be taken of that which occurs after the appearance of the twelve first teeth, or after the appearance of the sixteenth.

51. Weaning is commenced by ceasing to give the breast during the night.

52. After several weeks of weaning at night, lactation during the day should be entirely suspended, and the child thus acquires an independent existence.

53. Sleep is so necessary to children that they should be accustomed to a siesta of several hours in the middle of the day.

54. Walking in the open air, the action of the sun, are in all seasons as necessary to the youngest children as to the more aged.

55. A loose wrapper is the best clothing for a few days after birth, for it protects the child from cold without impeding the organic movements.

56. Loose well-made garments are always preferable to large clothes, which leave the skin in different parts of the body uncovered.

57. Young children should be washed every day with tepid water, and, by degrees, with nearly cold water.

58. The head should be washed with the greatest care, and it should be gradually cleansed from the scaly substance which covers it.

END OF PART I.

Part II.

ON THE GENERAL PATHOLOGY OF INFANCY.

SECTION I.

GENERAL CONSIDERATIONS ON THE DISEASES ON THE FIRST STAGE OF INFANCY AND ON THE MEANS OF THEIR DIAGNOSIS.

It is impossible to account for the phenomena which accompany disease in the first stage of infancy, without a knowledge of the principles and laws which govern the affections of that tender age; and this knowledge is more especially requisite for the due appreciation of the difference existing between the affections of infancy and the same affections developed in the adult. Nothing is to be compared to the influence of age on the character of disease, without it is the influence which climate exerts on the strength and form of plants and the large animals. When we observe the puny specimens of ricinus of our own country, and then compare them to the superb and gigantic ricini of inter-tropical countries—when we see the pale cacti of our hot-houses in juxta position with the brilliant and celebrated cacti of the New World—when we compare animals of the same species born in different latitudes, the Polar bear, for instance, with the bear of the Pyrenees—the lion of the desert with the lion of the forests of Brazil—we shall then comprehend the whole extent of the modifications produced in the development of individuals of the same species according to their place of birth, and consequently be struck with the difference which exists between the disease of a growing infant and the same disease in a well formed man in all the vigour of life.

In this chapter I will consider the general conditions by reason of which the diseases of infants differ from those of adults. I will then point out the most suitable methods for the diagnosis of these diseases; and will treat of the physiognomy of children, of their gestures, attitudes, cry, stature, and of all those external signs furnished by

the examination of the respiration, of the circulation, &c.—signs of so much the more importance to understand in proportion as the children are younger, and consequently less capable of describing their sensations.

GENERAL CHARACTERS OF INFANTILE DISEASES.

On Diseases of Children at the Breast.

The new-born infant is an imperfect being, whose organization, as yet unfinished, requires to develop itself. As Hufeland observes, we may designate the period which elapses immediately after birth and during the first year, the sequel of a creation, one-half of which is accomplished within, and the other without, the womb of the mother. Certain organs, hitherto inactive, commence their functions; they develop and modify themselves; others disappear; the infant passes into entirely new spheres of existence, first into extra uterine life, then into that of the senses, and, lastly, into the sphere of the intellectual world. The life of an infant is not, then, a normal state, but a succession of efforts to achieve this; and in this light it should engage the consideration of the physician. That which, under other circumstances, we should take for a disease, is here the effect and the symptoms of the work of nature, occupied in creation and development.

The infant at first weighs from six to eight pounds (French); at the end of a year, it weighs twenty pounds; of two years, twenty-four pounds; of three years, twenty-six and a half pounds; of four years, thirty and a half pounds; of five years, thirty-four pounds; of six years, thirty-seven pounds; of seven years, forty-one pounds. The stature changes with equal rapidity: from eight to ten inches in length at the time of birth, it increases to twenty-six or twenty-eight at the end of the ninth month; thirty to thirty-one at the end of the second year; thirty-one to thirty-three in the third; thirty-five in the fourth; and so on up to the age of seven years, when it is from thirty-nine to forty-one inches. At the commencement of life the functional activity is truly remarkable: nutrition, circulation, and the elaboration of fluids are effected with great rapidity. But if this acceleration of organic movements is necessary for the growth of the subjects, it determines—thus to express it—a fatal susceptibility in these organs which disposes them to diseases. On this account there is more sickness during infancy than at any other epoch in life. This morbid disposition is, moreover, indicated by facts of the highest importance—I allude to the mortality of new-born infants.

The first day is the most terrible to surmount: one-tenth of all new-born children perish; and we know that in France out of a million

of births per annum, 250,000—that is, the fourth part—are cut off by death before the end of the first year.

The infant receives with life a sort of existence which constitutes its physiological individuality or idiosyncrasy, which depends at the same time upon the climate, the age and constitution of its parents, their moral disposition, their diseases, &c.: it controls from the cradle certain unknown predisposing causes which may induce, at a later period, a great number of diseases, such as syphilis, scrofula, gout, epilepsy, mania, &c. By virtue of this puerile idiosyncrasy it can prevent some of these diseases up to the age of twenty, thirty, or forty years. There are others which it cannot keep in the latent state longer than five or six years; these are scrofula and epilepsy. But there is one—syphilis—which, in its hereditary form, appears, at the latest, six weeks or two months after birth.

There are some diseases peculiar to infancy; and others which are common to this age, and to every other period of life. The former, such as ophthalmia, convulsions, croup, certain diseases of the intestines, have their own special characters, which must be individually studied if we wish not to mistake them; the others, which appear at the same time in the infant and adult, present on comparison a specially modified form which establishes a marked difference between them. This modification principally relates to the lesions and the degree of reaction which they determine, that is to say, to the symptoms; so that in a great number of cases, the knowledge of the diseases of the adult would be of no avail in regard to the same diseases in infants, if a comparative study of them had been made. Thus, to cite one example only, nothing is more easy to recognize than confirmed pulmonary phthisis in the adult; whilst in the infant there is nothing which presents more difficulty. This is also the case with a great many other diseases.

The most frequent affections amongst children at the breast are diseases of the digestive and respiratory organs; then follow skin diseases and affections of the nervous system. However, nothing very precise can be stated on this point, for that which would hold good for the first period of lactation, would not do so entirely for the second period. In fact, if we mentally divide the life of the child at the breast into two parts, the one comprised between the moment of birth and the epoch of dentition, and the other extending from dentition to the ordinary term of suckling—that is, up to eighteen or twenty months, we shall find in this second period some diseases which assuredly are very rare in the first; diseases of the mouth for instance, apthæ, pseudo-membranous angina, and other affections, are far more frequent than in the first months which follow the birth.

All infantile diseases are but impressions transformed, and result

from the reaction which follows a morbid impression. Impression and reaction constitute, in fact, the most exact etiological expression for all diseases. Only here, as regards the infant, the impression is easily made, it is more profound and more serious than in the adult; the reactions also are more intense and more dangerous. There are some organs more susceptible than others; such are the brain, the lungs, the bronchi, and the intestines; therefore, we ordinarily perceive that morbid manifestations select these tissues and these viscera.

In a general manner it may be stated, without fear of deceiving ourselves, that the anatomical lesions of the diseases occuring during the first stage of infancy are less purely inflammatory than the diseases of the second stage of infancy, and those of the adult; they are more destructive it is true, but death is less frequently the result of the material disorders which they produce, than of the blow given to a weak organization by a too considerable dynamic reaction.

In fact, if we carefully examine the anatomical lesions in a case of pneumonia, and compare them with those of acute pneumonia in the adult, and seek in each case for the material element of that which we are accustomed to call *phlegmasia*, we shall be unable to establish any relation between them. Inflammation is feeble at this tender age — it is less plastic; it is, if we may thus express it, feeble like the patient in whom it develops itself: suppuration very rarely follows it; the material which it amasses in the cells of an organ remain there, for the absorbent powers are lessened and incapable of effecting their removal. If the infant does not sink, the disease often passes into the chronic state.

The subacute or chronic form is, in my opinion, one of the most important characteristics of these diseases: it is the one which assimilates them, up to a certain point, to the diseases of aged people. Thus, pneumonia much more often assumes the chronic form at these two extreme periods of existence than at the adult age. The same is the case with pleurisy and entero-colitis, the latter is especially remarkable from its tendency to put on the chronic form.

The anatomical alterations are not the only indications capable of revealing to the physician the difference which exists between inflammations in children at the breast and in adults; other signs, not less important, derived from the study of their symptoms, duration, and termination, tend to confirm this assertion. In fact, what a difference we find in the symptoms according to the disease! Is it not to the narrowness of the glottis in infants we must refer symptoms of dyspnœa and asphyxia which come on so suddenly in some affections of the respiratory organs? Is it not to the excessive sensibility of the nervous system we must attribute the spasmodic

and convulsive phenomena which indicate the commencement of acute febrile diseases, or the unfortunate termination of some chronic malady? Lastly, are there not in the febrile reaction evident differential characteristics of the highest importance?

In the infant, as in the aged, the febrile reaction bears no exact relation to the material lesion: in the former it is very intense, and would seem to indicate an unimportant disorder; in the latter, it is weak, sometimes wanting, notwithstanding the presence of very serious anatomical lesions; it is only in the adult where the balance maintains in some respects its equilibrium, and where one can judge of material injuries from the amount of reaction taking place.

The disparity existing between the amount of reaction and of lesion, is one of the most curious phenomena of infantile pathology, and possesses, in my opinion, an important medical signification. Thus, for example, the exaltation of the power which is observed to be so rapid and so varied in infantile pneumonia, in the pneumonia of adults and of the aged, attests once more, at least, the truth of this principle—that the lesions sustained being the same, each according to age, or other circumstances, has a manner of suffering them which constitutes his idiosyncrasy.

In young children, the reaction is made up of the whole of the general phenomena, such as affections of the general sensibility and motive faculty, disorder of the cutaneous calorification, and, lastly, by the state of the arterial pulsations. The pulse, it is true, only gives a proximate and exaggerated idea of the extent of the local changes, and of the dynamic resistance of the subjects; but nevertheless, it is a very useful indication and must not be neglected. Weak or strong, it is generally very varied in its acceleration, and daily presents one or two remissions. It rarely intermits, and this takes place in advanced disease of the cerebro spinal system. In infancy the febrile reaction is not continually the same; very rapid one moment, it becomes considerably diminished and then remounts to a very high degree. These alternations are especially remarkable at the end of some days of continued inflammation, either of the lungs or large intestine; they become very apparent when these diseases pass into a chronic form.

The affections of early infancy differ, then, from those of the adult in many respects; the ready action of exciting causes, the often exaggerated rapid reaction which quickly becomes lowered, the feeble plasticity of the inflammation which gives to the organic lesions a special character; a febrile state often accompanied with remissions, the rapid progress of symptoms, the precipitate terminations of the same, whether a cure is effected, whether death or a chronic state supervene; everything, however, permits us to state that the diseases

of infants at the breast show the stamp of excessive debility, which is in accordance with the delicate constitutions of the sufferers.

These general pathological considerations indicate the manner in which we intend to investigate the diseases of new-born infants and children at the breast. The opinions we have expressed will be confirmed in the following pages, and in the chapter which we shall devote to the consideration of febrile reaction.

We will now consider the general external characteristics of these diseases, such as observation has pointed them out to us; they are of the highest importance and are furnished us by the means of expression peculiar to infancy.

SECTION II.

ON THE MEANS OF EXPRESSION IN CHILDREN.

It is by no means an easy thing to understand a helpless infant, who at first seems to have no want but that of nourishment and sleep; whose intelligence is only commencing to develop itself, and who seeks to take cognizance of all the unknown bodies which surround it. If the task becomes less difficult at a more advanced period, it must, nevertheless, be granted that it still remains troublesome as long as speech does not aid the embarrassed patients in the expression of their sensations.

Up to this period, then, the practitioner who examines a suffering child, derives nothing from articulate language, since it is insufficient; he must have recourse to other means. Previous to speech, God has given to the child a language which philosophers call natural language: it is the language of signs. The practitioner should recognize it, and should even study it scientifically, in order to avoid the commission of the most serious errors. The knowledge of this language is especially precious to him in the observation of diseases of infancy; as in the case of a dumb person, a glance of the eye should direct the practitioner so as to apply the resources of medicine.

In the child, in order to be the wise interpreter of his natural language, his physiognomy, features, eyes, gestures, cry, and attitude must be studied; if we add to this study, on the one hand, the observation of certain characters derived from the state of agitation, or of rest, in little children, and on the other, the results of the inspection of certain important external symptoms, such as the examination of the pulse, mouth, abdomen, products of secretion, vomitings, stools, &c., we shall be possessed of all the information necessary to form a correct opinion on the greater part of the diseases of childhood.

CHAPTER I.

ON THE PHYSIOGNOMY OF SICK CHILDREN.

Criticism has been severe on those who have endeavoured to read on the face that which is buried deep in the soul. In this there is nothing which should surprise us. It has not been less merciful to those physicians who have conceived themselves able, without neglecting the other means of exploration, to determine the existence of a certain number of diseases from the inspection of the physiognomy, the attitude, the gesture, &c. This may surprise us the more, especially when we consider that most of our experienced teachers permit their genius to guide them, and often form a diagnosis of a disease without addressing a single question to the patients. The natural language is only unintelligible to those who will not make efforts to comprehend it.

The works of Hippocrates, Galen, Avicenna, and Boerhaave, contain much valuable information relating to the changes of the physiognomy in the diseases of the adult. They contain but a few observations applicable to children. The same is the case with the treatise of Stahl *(De facie morborum indice)*; of Quelmalz *(De prosocopia medica)*. The work of Thomas Fieni *(Philosophi ac Medici praestantissimi semeiotice sive de signis medicis)* includes more details; but it contains nothing which has not already appeared in Galen and in Hippocrates.

Authors of modern treatises on diseases of children have united in their attempt to destroy the results obtained by some physicians in their studies on the physiognomy of disease. With the exception of Underwood, the translation of Eusèbe de Salle, Jadelot, and Billard, there are scarcely any who have understood the importance of these studies, when they are not exclusive, and who have decided in according them the importance they deserve.

M. Jadelot, who has never published any of his researches, has, nevertheless, contributed more than any one to diffuse this valuable knowledge. All the pupils may have seen him practising at the bedside of the patients. He excelled in the difficult art of scrutinizing the physiognomy of children, in order that he might there discover the nature and progress of their diseases. According to this physician, it is especially *from the period of dentition to puberty* that some assistance may be derived from semiologic physiognomy.

Still, if M. Jadelot, with his spirit of observation, can readily

appreciate, and in a very decided manner too, those modifications, often as variable as they are fleeting, impressed by diseases on the countenance of children, he is probably in error in wishing to translate them in precise terms, with too absolute or too restricted a signification. A portrait cannot be described, it is painted; happy the inspired artist who animated the canvass; unhappy he who replaces the brush by the pen in the description of a face. The portrait would always be inferior to the model.

The aptitude of judging of physiognomies depends much upon genius. Certain men have been richly favoured by nature in this respect; there are some who possess this talent in the highest degree, but, in my opinion, habit and experience may do much for those who have been less favoured. I shall now attempt to interpret, clearly, the results of my observations on the morbid physiognomy of children at the breast. To this I shall devote the more care, since M. Jadelot and his commentator, M. Eusébe de Salle,* have only studied the alterations of the physiognomy in the second stage of infancy, declaring very erroneously that in the first, that is to say in children at the breast, the face had no decided features, and that it is impossible to discover anything there in a semeiotic point of view. This is a gap which these authors have left for me to fill up, and very fortunate shall I esteem myself if I can do so properly.

On the Colour of the Face and Integument.

Children which are just born, present a red colouration on the face and body, which preserves its intensity for about four or five days. During this time, if pressure is made on the integument, the colouration is effaced and the skin appears yellow; then the blood gradually returning into the capillaries from which the pressure had driven it, this yellow tint is replaced by the previous red colour. From the fifth to the eighth day this colour disappears, the skin now presents a general yellowish tint, which results from the slow absorption of the blood infiltrated into the tissues at the time of birth.

[This assertion, that the yellow colour of new-born children depends on the slow absorption of the blood infiltrated into the tissues at birth, would appear to be erroneous, from the fact that not half of new-born children are thus affected; but that, on the other hand, it seems most likely to be the result of slight jaundice, from the great frequency of this disease in new-born children, and the influence which purgatives exert in removing this yellow colour of the skin.—P.H.B.]

Sometimes this more or less intense yellow coppery colouration, is observed beneath the skin, at the same time that it exists under the conjunctiva and beneath the tongue; it then constitutes a true jaundice which depends on the passage of the bile in the blood, and which is

* Underwood, *Treatise on Diseases of Children.*

the result of a slight attack of hepatitis caused by inflammation of the umbilical vein.

After the eighth day the skin assumes a whitish tint, becomes transparent and rosy, with decided colour on the cheeks. It thus continues during the calm of the children, but it changes with their agitation. The face reddens, becomes more or less decidedly congested, according to circumstances, in the little fits of passion of this age, in the more or less distressing efforts of cough, &c. Thus in hooping-cough, the face sometimes becomes quite blue, and blood escapes by the eyes* or by the nostrils.

This disease is not the only one in which the colour of the face may furnish valuable information. Thus, nearly abolished in the diseases of the chest, this colouration acquires an immense importance in the affections of the nervous system.

The sudden, fugitive, and intermittent red colour of the face, is a certain sign of acute cerebral disease.

The cyanosis of the mucous membranes and of the skin always reveals the existence of an organic affection of the heart.

In diseases of the larynx, sufficiently intense to impede hematosis, the degree of the asphyxia is often only estimated by the colour of the integuments, and from this colour that the employment of an extreme means now become necessary is decided on. Thus, in croup, the usual white rosy tint of the face, is very sensibly altered; the base is no longer the same, from rose colour it passes to blue, similar to the tint of the lips, the brilliant colour of which has disappeared. The duskiness rapidly increases in intensity with the disease; when the cyanosis becomes very evident, and when we at the same time observe that peculiar condition of the pupil and of the eyes, to which we shall again refer, there can be no possible hesitation; from these symptoms of danger, energetic treatment must be at once adopted; tracheotomy is indispensable.

The colour of the face is singularly altered in the diseases of the alimentary canal. I need scarcely mention the red, coppery, blackish tint, and the black tint, which become successively manifested on the outside of the mouth in spacelus of this part; but I shall allude to the leaden tint which replaces the clearness of the skin in children attacked by thrush and entero-colitis. The eyes are then excavated, the face sallow, the lips pale, colourless, without presenting the blue tint of asphyxia.

Diseases of the liver are rare amongst children at the breast; in the colour of the face and body an important indication of their existence is met with. The skin, conjunctiva, and mucous membrane beneath the

* This circumstance is excessively rare, but I have observed it at the Necker Hospital, in the practice of M. Trousseau.

tongue, assume a very decided yellow colour. The value of this symptom is the more important, as there is not, I suppose, in these young children, an idiopathic icterus the result of an acute moral impression. All the cases of icterus I have seen, originated in an affection of the liver.

In following up these researches, we may allude to the reddish roughened colour of the face and eyes in children threatened with an eruptive fever, the bluish pearl-like colour of the conjunctiva in tuberculous children, the coppery tint of certain blotches of the face of a syphilitic origin, &c.; but this would be probably exceeding the bounds of the field of positive observation. We here terminate that which refers to the colour of the integuments.

On the Features and Expression of the Face.

If the face of a sleeping child is examined, we are delighted at observing there so much calm and serenity. Not a fold, not a wrinkle disturb the surface. The respiration is slow and quiet, the pulse feeble and regular.

Grief and joy are the transient passions which disturb this picture. The features become sharpened and contracted in suffering; they expand, on the contrary, when agreeable sensations are present.

Every one can recognize these signs, which betray the impressions of the mind; it is useless, therefore, to insist upon this further. What concerns us is, to discover on the face, in the manifestation of pain, the features which indicate its origin: now this is possible in a great number of circumstances. Thus, children who suffer in the head, in consequence of an acute affection of the meninges or of the brain, add to their cry a very evident alteration of the features. Sometimes it is an eyelid that cannot be raised, and leaves the eye half open; at others it is the nose, one of the nostrils of which is drawn down; sometimes it is the mouth, the commisure of which presents a considerable deviation; at others, again, it is strabismius, convulsions of the face, &c. More need not be required.

Is it not, moreover, in one of the chronic diseases of the brain, in hydrocephalus, that we meet with that peculiar appearance of the countenance, occasioned by the disproportion of the cranium and of the face? Is not this deformation the most certain index that we can have of this disease? Has one ever been deceived in the case of a young child, whose head is enormous relatively to the face, whose forehead is raised and projects forwards, whose frontal eminence on one side is visibly more prominent than that of the opposite side, and lastly, whose vision is rendered divergent by the dilatation of the base of the cranium above the orbits? Assuredly not; moreover, other symptoms tend to increase the value of the preceding ones; but, in their investigations, the physician proceeds to the verification of an hypothesis formed in his mind on the first sight of the patient.

Amongst the affections of the chest, let us take pneumonia, as one of the diseases which it is the most easy to recognize by the external symptoms. The examination of the nostrils is often sufficient to indicate its existence, and the alteration of the features which accompanies it is one of its best characteristics. At each inspiration the nostrils dilate with a considerable effort, the eyebrows are knitted, and sometimes, but this is at a very advanced stage, the lips are widely open, in order to facilitate respiration. These signs, such as I have just described, would be insufficient, did we not observe at the same time the gestures and cry of the little patients. Thus, placed beside a cradle containing a patient who utters a plaintive and jerking groan, followed by an inspiration and moment of repose, whose nostrils forcibly dilate, whose ribs are depressed laterally with violence simultaneously with a considerable projection of the abdomen, the physician may suppose that it is a case of pneumonia, and forthwith proceed to the verification of the diagnosis by the ordinary means. His falling into error would be a matter of difficulty.

The pleurisy of children at the breast does not present any of these signs. They are sometimes met with in *very intense capillary* bronchitis, but it must be allowed that it is very difficult to distinguish it from *lobular pneumonia*, even by the aid of auscultation.

The diseases of the abdomen are of a nature to exercise the sagacity of the medical physiognomist. Some of them manifest themselves on the face by characters which it is impossible to mistake; others, on the contrary, leave no impression on its surface.

Acute entero-colitis is accompanied by speedy and evident deformation of the features. This deformation has already been pointed out by some physicians as peculiar to softening of the mucous membrane of the stomach. But the existence of this disease is far from being proved; it is probable that it has been confounded with that to which we allude (see *entero-colitis*); the discovery of the similarity of the features between them, which I am about to enumerate, is not then to be wondered at.

In these diseases, and in the short space of one night, the face becomes sallow and rapidly emaciated. The lips lose their colour, the nose becomes sharpened, the cheeks are sunken, the eyes hollow, lose their lustre, and are surrounded by a deeply excavated sub-orbital ring. What can be at the same time more characteristic and peculiar? There is no other disease which presents such symptoms.

Should colic come on, as it frequently does in this disease, the child cannot direct our attention to it: it is, however, possible to detect it. Over this countenance thus changed, to which we have just alluded, passes a cloud of pain; the face becomes sombre, the features contracted, the eyebrows drawn together, the eyes half closed,

the nostrils elevated, forming a wrinkle on the cheek; the lips, momentarily agitated, separate, and cries are uttered. At the same time the young child flexes the thighs on the abdomen, which he stretches with an effort, violently twists himself, then calm reappears, and all returns to the usual condition.

In chronic entero-colitis, other characteristics, of not less value, are observed on the face.

The rapid emaciation of the countenance, observed in acute entero-colitis, does not fail to progress. It has not continued to advance in the same proportions; this would be a matter of impossibility. The skin, deprived of its cellular tissue, remains soft, flaccid, and wrinkled on the muscles which draw it in every direction.

The children then present emaciated figures; they are fleshless; all the bones project; numerous wrinkles furrow the forehead and around the eyes, on the cheeks, around the lips, on the chin and neck. They resemble little old men about to die, and as a witty physician, one of my teachers, observed, they possess the Voltairian countenance. To him who is conversant with the sketches made of the face of this great philosopher, this term will call to mind the appearance which I have described, I shall therefore adopt it.

But, it might be observed, if this appearance be the result of the emaciation, it should be met with in all other chronic diseases. The objection has weight; I shall endeavour to solve it so as to accord to these studies of the morbid physiognomy as much value as possible, without pretending to give them an exclusive confidence.

Facts alone should determinate the question: in infants at the breast there is no other chronic disease but the affection of the intestines, which is capable of thus causing the disappearance of the cellular tissue of the face, and giving them this character of premature old age of which we have spoken. Even pulmonary tuberculosis, which is essentially a chronic disease, does not produce this result, for it is the acute symptoms of pneumonia, and not consumption, which put an end to existence.

Chronic pneumonia is the only disease in which life is sufficiently prolonged to communicate to the physiognomy the well characterized appearance of decrepitude. And then it may be asked if alvine evacuations, sufficiently numerous to constitute consecutive entero-colitis, have not presented themselves as complications of this pneumonia, so as to constitute the greater part of the influence of both these diseases.

[Dr. Schreber remarks (*Die Eigenthümlichkeiten des Kindlichen*, p. 55): "In all diseases associated with diminished nutrition, the child emaciates far more quickly than the adult, but, on the other hand, the former regains its condition much sooner than the latter. Such emaciation, if the disease is not very dangerous, is of no great

import so long as the countenance does not exhibit marked change; but if it does, if it assumes an unnatural, more aged, thin, wrinkled appearance, we may always reckon upon a deep and danger-threatening diminution of reproduction, and of the whole vital power."—P.H.B.]

There is yet another disease of the alimentary canal, which was formerly attempted to be diagnosed from the inspection of the face: it is perhaps the only one which it is impossible to recognize in this manner—I refer to the presence of worms in the intestines.

If we are to believe authors, children attacked with this disease present a grey leaden tint, bluish conjunctiva, very dilated pupils; and they are continually contracting their nostrils, in consequence of a rather intense itching of this part of the face. Thomas Fieni, *Signa a naso*, thus expressess himself: "Itching of the nose, in acute diseases, indicates delirium; if it has no evident and manifest cause, as a hair which irritates it, it announces the presence of worms in the intestines, especially in children."

I am not aware whether it is thus in the districts where the verminous affection is common; but at Paris, where it is rather rare, nothing of the sort is observed. Children who have worms, do not often present the pearl-like condition of the conjunctiva and the dilatation of the pupils; they do not complain of itchings of the nose, and they do not carry their hand to this part of the countenance in order to testify their sensations when their speech is insufficient to express them. On the other hand, the dilatation of the pupils, the blue tint of the conjunctiva, and the itchings of the nose, exists in children who have not worms, or who, at least, have not passed any in their stools.

Certain general affections leave an impression on the physiognomy which cannot always be recognized, for the change in the features is not considerable. Thus the scrofulous affection is ill characterized externally in children at the breast; its manifestation is more tardy. The face very rarely presents the aspect which, at a more advanced period, is caused by the enlargement of the glands of the neck, the redness and tumefaction on the edges of the eyelids, &c.

On the Expression of the Eyes.

The eyes of the infant are open at the time of birth, but they appear to be insensible to the action of light. They are dull, without expression and without a fixed look; life does not yet animate them, they move in all directions but without any determinate aim. At the end of a fortnight they follow the light, insensibly accustom themselves to exterior objects which they finally recognize at the age of six weeks or two months.

The first, and one of the most interesting characteristics of pathological physiognomy, furnished by the examination of the eyes, relates

to the condition of the pupil during sleep, syncope, and after death.

In sleep, when the eye is protected against light, the pupil is strongly contracted; this is a phenomena which theory would not have forseen, but one which the observations of Cuvier, of Dugés, of Mayo, and of most physiologists, demonstrate in a positive manner; we have been frequently able to verify it. It dilates, on the contrary, and resumes its normal dimensions on awakening, the eye becoming exposed to bright daylight.

The complete, absolute, definitive dilatation is observed at the moment of death, and constitutes with the dilatation of the other sphincters, one of the best signs of this event. This is a fact which I have well established in my researches on the distinction of real and apparent death.*

If we except certain affections of the brain, accompanied by paralysis of the optic nerve, in which we observe dilatation of the pupil and amaurosis, the examination of the iris does not furnish very important signs in the diagnosis of diseases of children at the breast. The deformations of which the pupil is the seat in the adult, in certain affection of a syphilitic nature, are not observed in young children.

The eyes—and when we speak thus it must be understood that the eyelids and the globe of the eye are included—the eyes present decided alterations in many diseases of the first stage of childhood.

It is useless to refer to the anatomical modifications of which these organs often become the seat; the modifications constitute diseases purely external, which are discovered at the first examination.

In the affections of the brain, strabismus and the drooping of the upper eyelid possess considerable importance; these signs have not, however, an absolute value. We must at the same time have regard to the progress of the disease, and to similar derangements observed in the other parts of the muscular system.

Thus, when these two signs make their appearance in a child who has been ill one or two weeks, and when at the time general convulsions and hemiplegia are observed, the existence of a cerebral fever cannot be doubted; but if this paralysis of the upper eyelid is primarily established, at the time of a convulsion, in a child in good health, the diagnosis is no longer the same. Without being able to state decidedly what is the nature of this paralysis, we certainly know that it is independent of the affection of the brain.

In other cases the paralysis appears slowly; it is accompanied by a considerable dilatation of the pupil, and the eye cannot be directed towards the nose. There is paralysis of the third pair; it is this form of paralysis which determines the drooping of the eyelid, the impossibility

* *Traité des signs de la mort et des moyens d'empêcher les enterrements prématurés* (Couronné par l'Institut de France), 1850.

of turning the eye inwards, and the dilatation of the pupil. The optic nerve is not affected, and, nevertheless, vision is nearly abolished. Paralysis of the iris is the cause of it.

Paulus Ægineta (lib. iv, cap. 57), Avicenna (lib. iii), and Thomas Fieni *(loc. cit.)*, considered the half-closed eyes in sleep as a sign of worms in children of good health, but this is, however, an observation to which I attribute no importance whatever.

We often observe in the eyes the indications of several other morbid conditions of the child. Who does not recognize, for instance, the redness of the eyes, the swelling of the eyelids, and lachrymation, as the precursors of measles? Who cannot appreciate the brilliant aspect of the iris, the extreme contraction of the pupils, provoked by the ingestion of a small dose of opium? I shall not here again remark upon the pearl-like condition of the conjunctiva, which has been looked upon as characteristic of the verminous affection; this fact requires to be verified by fresh observations in order to prove its exactitude and constancy.

CHAPTER II.

ON THE GESTURE AND ATTITUDE.

All those who have studied the physiognomy have necessarily devoted a chapter to the development of the signs furnished by the various gestures and attitudes of individuals; these signs are but very rarely deceptive. The quick and firm walk of the man who carries his head proudly, whose chest is ample, and whose upper limbs move in unison, is as imposing as the stern aspect of a face the features of which are refined, the lips compressed, and the look determined.

As the attitude often betrays him who would render his physiognomy impassive, so also it furnishes the physician with signs which he must not neglect. If these signs possess considerable value in the physiological state, their importance is not less in the morbid condition.

In every disease the patient instinctively seeks the most favourable and the least painful attitude. With respect to the movements of the body and the gestures, as they are wrung out by suffering, independent of the influence of the will, they must be taken into consideration, for they may enlighten the physician in his investigations.

It has been observed, with a show of reason, that children at the breast, confined in their infantile trappings, were not at liberty to assume the attitude most advantageous to them, and that they remained in the position in which it was desired to place them. Thence the conclusion has been arrived at, that the signs furnished by the attitude

of children are of no account. It might as well be said that the physiognomy has no expression in people who, as a matter of custom, veil their countenance.

We must not reason thus. The expression of the face is studied when it is placed in the most advantageous position for the examination of the features, that is to say, when the face is uncovered. Let the children be free, and the gestures and attitude which betray the suffering of such and such an organ may be appreciated.

Thus when we observe a young child attacked with cerebral fever, at the commencement, during the stage of *germination*, he is suddenly heard to utter piercing cries; the hand is either raised, striking the air, or pulling at a portion of his clothing or of the materials which cover him, as if to remove an object which frightens him. This gesture is characteristic, and in children of more advanced age, speech comes to their aid, they call their mother to their assistance to deliver them from *the beast* which they perceive before them.

Sometimes, at this moment, the body assumes a strange attitude; the face expresses fright; the children sit upright, and are much concerned to get rid of the object of their terror.

At a more advanced period of the disease, in the convulsive stage, the gestures and attitudes are different. The movements are automatic; thus the hand wandering over the counterpane *labours* to pluck off the nap; moreover, the limbs are agitated by general convulsive movements, or are contracted. Lastly, in some patients, the body is in the most profound state of prostration; one of the sides is affected with paralysis, and is observed in the most complete resolution; the other alone remains capable of motion. Are these gestures then of no value, and is this attitude insignificant? No; there is no physician who is not already cognizant of its complete importance.

In the diseases of the mouth, at the period of dentition, when the buccal mucous membrane is intensely inflamed, perhaps ulcerated, particular gestures indicate the seat of the suffering which the evolution of the teeth occasions. In a little girl, twenty months old, in whom the process of dentition was tedious, the lips were forcibly separated, the mouth half open, and the four fingers of both hands were incessantly pressed between the dental arches.

In the diseases of the larynx, in croup, the children cannot remain completely recumbent; they become suffocated, and utter cries until they are placed in a sitting posture, supported by pillows which keep them in this position. They wish to be incessantly carried on the arm, because in this vertical attitude they find a point of support which facilitates their respiration.

When they are observed at the periods of the crisis of suffocation, and of the attack of dyspnœa, which determine the asphyxia in the last

stage of the disease, they are heard to utter screams; and when they are laid down they make violent efforts to raise themselves. Thus, when the hand is presented to them, they seize it with a convulsive grasp, and, pulling it rapidly, raise themselves on their bed, throwing back the head so as to seize the air which seems to escape them.

In some children it is not the attitude alone which must be considered; the gestures are also at this time very significant. How many times, in these cases, has one not seen them carry their hands to the neck, and compress the larynx laterally, as if to remove the obstacle to the introduction of air in the chest. There is no tracheotomised child in whom similar movements are not observed. They are not the result of the pain caused by the presence of the canula, for they are not continual. They only exist in the moments of deep distress, in which the obstruction of the canula is about to determine asphyxia.

In pneumonia, the attitude of children presents nothing which deserves to be indicated in a special manner. The gestures and movements of the body, on the contrary, are more significant. They have been pointed out in speaking of the alterations of the physiognomy; they will, moreover, occupy our attention further on, when the external phenomena of respiration are treated of; it is, therefore, useless to refer to them in this place.

It is, further, by particular movements, without the aid of speech, that the child expresses to us the suffering which it experiences in the interior of the abdomen. These movements are fugitive; they are correctly referred to the pain produced by colic.

In fact, in the course of a slight irritation of the bowels, the face, usually calm, becomes suddenly contracted; the child cries out; flexes the thighs on the abdomen, which it forcibly makes tense; twists about for a moment, and all these symptoms disappear at the end of some seconds, when, at the same time, the habitual serenity of the face reappears.

The observation of the attitude and gestures presents, then, whatever may have been said to the contrary, characteristics sufficiently interesting to fix the attention of the pathologist; but we have not yet enumerated all of them. There are diseases of childhood in which these characters form the indispensable basis of the diagnosis. Thus, the involuntary and tumultuous gestures of the limbs most surely betray the affection known as St. Vitus's dance. However, it must be admitted, that this disease is scarcely ever observed in children at the breast.

The feeble attitude, so to speak, of certain children arrived at the age of fifteen or twenty months, the impossibility which they experience of holding themselves upright, even when the hand is given them as a support; the incurvation of the vertebral column, the legs, and the thighs; the deformity of the chest; are the only characteristics

of a disease of rather common occurrence in the early stages of childhood; they indicate rachitis: it is important, then, to recognize them.

Lastly, we may mention the different attitudes of the body consequent on muscular retractions; the nature of which is, at present, little known. Thus, the deviation of the head, of the stature, &c., in consequence of the retraction of the sterno-mastoid and spinal muscles, are diseases which inspection alone will detect; it would be puerile to dwell upon them further.

CHAPTER III.

ON DEVELOPMENT AND ON PLUMPNESS.

The size of children, their degree of plumpness, can only furnish general notions, very imperfect ones it is true, but which, however, must be taken into consideration. They may be insufficient when it is required to give a precise diagnosis, but they may be of assistance to the physician. Thus, it is remarked, such a child does not make progress, because it is feeble, of small size, and that at its age other children are much more developed than it. The fault of this is often in the nurse, who is too indifferent; who saves herself by giving it too little suck; or who affords a poor and insufficient supply of milk. In these cases, change the nurse, and the child will recover its strength, and will become developed with an increased vigour.

When we make an observation on a sick child, its condition of thinness or of plumpness produces a certain impression on the physician, which, alone, is often sufficient to indicate the nature of the disease, its acute or chronic form, and even its approximative duration. It is thus that an acute or chronic diarrhœa, or a case of rachitis, may sometimes be recognized.

In the acute state, the emaciation is rapid; the flesh, naturally smooth, is soft and flabby, but the skin is still rather firm: its surface is not yet thrown into folds. In the chronic state, on the contrary, besides the flaccidity and the softness of the tissues, the skin appears to have lost its elasticity; it preserves the fold which the pressure of the finger causes; it is covered with wrinkles which become still more decided at the period of muscular contraction. The persistence of the fold of the skin consequent on the pressure of the fingers is especially observed in the diseases of the abdomen. It is sufficiently constant in entero-colitis to be ranked amongst the symptoms of this disease. In rachitis, the disproportion between the head and the limbs, which are relatively smaller; the latteral flattening of the chest; the size of the belly; and the enlargement of the larger articulations, are sufficient to establish the diagnosis.

In the study of diseases of the first stage of childhood, we must, then, take into consideration the development and the plumpness of the subjects. We may here discover signs which do not possess great importance, it is true, but the value of which cannot be completely put aside.

CHAPTER IV.

ON THE CRY.

The cry, the most natural manifestation of suffering, is at the same time the most energetic of the child's means of expression, to whom speech is wanting. In a special manner it indicates pain, the origin and the source of which it occasionally specifies by the various modifications which it experiences.

Like the articulate voice, the cry presents particular characteristics easily appreciated but impossible to describe, characteristics peculiar to certain passions, certain moral pains, and certain physical sufferings.

Voice betrays the man, and reveals the sweetness as well as the asperity of his character, his sincerity as well as his probity, the good as well as the evil sentiments which animate his soul, courage as well as cowardice, love as well as anger, &c.

Young children also know how to manifest their joy, their impatience, and their anger, by cries which every one can recognize; but these are not the ones we are about to consider. In the state of disease, the cries are caused both by moral griefs and by physical pains, which result from the affection of such or such an organ; all these cries are modified by the age and constitution of the children, and sometimes even by the nature of the sufferings which provoke them. We have, then, to investigate what are the characteristics of the cry in the diseases of young children.

These modifications are easily appreciated, and any one may detect them. It is always very embarrassing to translate them into common language. In fact, the sound which strikes the air and arrives at our ear penetrates and impresses us, without our being able to give a description of the sensations to which it gives rise. Although fugitive and varied, these sensations are real, and sometimes very profound. We may be convinced of this by the remarkable and well authenticated examples of several mothers, who, in calamitous circumstances, separated from their child, have been able to recognize it, amongst a thousand others, simply by its cries.

Notwithstanding these difficulties, which render the interpretation embarrassing and obscure, we propose examining the characters of the

cry in the affections of young children; and we shall endeavour to determine whether the modifications which it undergoes are really under the influence of their different states of suffering.

The cry is always produced at the moment of expiration, it lasts as long as it can, ceases during the inspiration which follows, and reappears with a fresh expiration. In some children the inspiration is itself noisy; this is what Billard has qualified by the name of *reprise*. Thus in the cry two distinct periods exist: the cry, properly so called, which takes place during expiration; and the *reprise*, which makes itself heard, on the contrary, during inspiration. The cry is usually stronger than the *reprise*. They both undergo the modifications to which we shall allude further on.

At the time of the cries a general phenomenon, characterized by turgescence of the face, colouring of this part and of the whole surface of the body, by a general congestion, seems to indicate the presence of an obstacle to the return of blood in the heart. The veins of the neck and hands are swollen, and in sick children, who have erythema or inflammation of a portion of the skin, the areola of vaccination for instance, these parts assume at the time a much more decided colour. The cerebral congestion is so intense in some children, at the time of their cries, that they fall back, faint, and swoon for some seconds. This condition is not far removed from asphyxia.

The cries are often accompanied by an abundant secretion of tears; this phenomenon is not observed in very young children: the lachrymal gland has not yet assumed its functions. It only commences to secrete towards the third or fourth month. It is then right to take into consideration the presence or the suppression of tears; for, as M. Trousseau has remarked, the functions of the lachrymal gland are suspended under the influence of very severe acute diseases. The suppression of tears might then be considered as an important general symptom in the prognosis of diseases.

The cries may be changed in their form, in their tone, and in their duration.

[The tears of children may certainly furnish something towards the prognosis, for M. Trousseau states that it may be laid down as an aphorism as seldom liable to exceptions as those of Hippocrates, that when a child sheds tears a favourable prognosis may be delivered, however menacing the symptoms; while when this is not the case in painful diseases, and especially if the eyes are dry and sunken in the orbits, great danger to life exists. The observation applies almost invariably to children less than two years of age, and particularly to those less than one, but may frequently be verified even until seven. In no one of his operations for croup has he ever seen a child shed tears, and he has always felt much pleased if they did so some days after, as when they did not the unfavourable prognosis given was almost always verified.—P.H.B.]

The changes, relative to the form of the cries, are indicated by their state of weakness and by their painful or smothered character.

The weakness of the cries is especially met with in young children who come into the world scarcely alive, in a state of semi-asphyxia, and in children who, at a more advanced age, are weakened by a chronic disease and nearly moribund.

The smothered cry is principally met with in the affections of the respiratory organs, and particularly in well characterized pneumonia. In this case each expiration is accompanied by a completely smothered cry; it is a well defined groan rather than a cry. However, it is excessively rare to meet with it in the course of other diseases; its presence should then be taken into consideration.

The changes which affect the tone of the cry are sufficiently important; thus the single, sharp, and very powerful cry, appearing at rather distant intervals, has been referred by MM. Maunoir, Coindet, and a great number of physicians, to acute cerebral diseases. The name of hydrocephalic cry has been applied to it. It is too frequently wanting, so that a great semeiologic value cannot be attached to it. The following, moreover, is a fact which still further deprives it of a portion of its importance: this is, that it is also met with in the course of other diseases. Thus, according to MM. Auvity, Billard, Valleix,* this sharp cry is met with in the œdema of the newly-born. Here, however, it is more feeble and much more frequent; it is repeated every minute. But, granting that the modifications presented by these cries are very evident, and consequently even characteristic of a particular morbid condition, it appears to me impossible to point them out in a more precise manner.

There is scarcely but one disease in which the cry presents important and characteristic modifications; I refer to croup. The cry is muffled, the expiration hoarse, and there is sometimes a noisy inspiration which authors have compared to the crowing of a young cock. At the last stage of the disease the inspiratory noise disappears; nothing remains but the hoarse and considerably enfeebled expiration; it may be truly said that the voice is extinct.

Billard† speaks of a tremulous cry which he has only met with three times in very young children affected with an œdematous angina. He suspects that this modification belongs to the disease which he refers to, but he dare not affirm it; and he sagaciously remarks that we must wait until further observations tend to confirm this fact.

The duration of the cry of children merely indicates a very acute pain, without any relation to the affection of such or such another organ. Billard believed that a prolonged cry was to be observed in diseases

* *Clinique des maladies des enfants nouveau-nés;* Paris, 1839; p. 627.

† *Traité des maladies des enfants nouveau-nés.*

of the stomach, colic, ileus, peritonitis, &c.; but as these facts have not been established in a very definite manner, their precise value cannot be decided upon.

Although the signs furnished by the study of the cry of children have not furnished us with very splendid results, they must not be neglected. Future investigators may probably derive greater advantage than we have yet done. Not only is it necessary to hear the natural or spontaneous cry, but if the children do not cry when we examine them, they may be slighty shaken in order to compel them to utter some cries, which may enlighten the physician. In a word, the cries must be provoked, so that nothing may be neglected in the examination of the patients. The signs furnished by the provoked cry are much the same as those furnished by the spontaneous manifestation of pain.

CHAPTER V.

ON THE EXTERNAL SIGNS FURNISHED BY THE EXAMINATION OF THE MOUTH AND THE ABDOMEN.

Of the Mouth.

The inspection of the mouth furnishes the physician with a great number of signs, which it is very important he should recognize. Thus, without reference to the deformities of this part which alter the appearance of the face, and which have been previously discussed, we find objects of study in the colour, the heat, and the dryness of the buccal mucous membrane, its accidental productions, the manner in which suction is performed, the products of secretion, the odour, &c.

In order to appreciate most of the characters we have just referred to, it is sufficient to introduce the finger into the mouth of a very young child. We thus recognize the more or less intense heat of this part, its state of dryness, which is never considerable, the swelling of the gums, the number of teeth already pierced, and sometimes even the cryptogamic mass of thrush developed on the surface of the mucous membrane.

Ocular inspection now gives more value to this preliminary examination; the child becomes agitated, cries, opens the mouth widely, and we may then, by depressing the tongue with a spoon, perceive the redness, the ulcerations, and the accidental productions of the mucous membrane.

By the introduction of the finger into the mouth of young children, we may to a certain extent judge of their natural vigour, and ascertain the state of weakness into which disease has thrown them. This operation always deceives them; they believe they are seizing the

breast, and suck the end of the finger with more or less avidity. The efforts of suction are very violent in children in good health, and in those who have only a trivial affection. They are very feeble, on the contrary, and sometimes annihilated, in those whose constitution is ruined by a chronic disorder, or who are labouring under a very serious acute disease.

The examination of the mouth is not always very easy. Children who are of a more advanced age struggle against the physician, and forcibly keep the jaws closed. The nose should in this case be pinched, so as to compel them to breathe through the mouth. They cry, and we may then profit by this moment to make the exploration of which we are now treating.

From the mouth an infectious odour may arise which offends the nose, and which, alone, by its presence indicates gangrene of a portion of the buccal cavity, one of the most terrible affections of childhood.

We must not terminate what relates to the examination of the mouth, without mentioning a phenomenon which sometimes causes uneasiness to parents, but which, nevertheless, is of no importance. I refer to the secretion of saliva. The same is the case with this secretion as with the secretion of tears. It does not exist during the first months of existence. It only becomes established towards the fifth or sixth month, at the approach of the dental evolution, and probably under the influence of the irritation caused by this process. The secretion of saliva is rather a physiological fact than a morbid phenomenon. This liquid only flows so abundantly externally because the teeth destined to retain it in the cavity are absent.

Of the Abdomen.

The abdomen is the most voluminous part of the child's body. Its extent is very considerable, and appears to be in relation with the activity of the digestive functions at this age. This disposition is quite natural and presents nothing which should occupy our attention.

In the state of disease, it is important to discover whether the belly is tense and painful. The exploration is not always an easy matter, for the agitation which it causes provokes cries and tension of the abdominal muscles, which prevent our arriving at the wished for result. The attention of the child should then be distracted, by showing it an object in which it becomes interested. When its attention is fixed, the hand may compress the abdomen, and discover if it is supple and especially if it is painful. The gestures and the cries of the child are in this case the index of pain which it experiences in consequence of the pressure of the hands, for they cease with the examination.

The pain of the abdomen is never very intense in children, it exists nevertheless, but to a slight extent. It is especially observed in catarrhal diarrhœa and in entero-colitis.

CHAPTER VI.

ON THE EXAMINATION OF THE CHEST AND ON THE RESPIRATION.

The examination of the chest has for its aim the recognition of external characters of the respiration, the different varieties of the respiratory bruits, the resonance of the chest and the various deformities to which the walls of this cavity may be subject.

We should here only treat of the signs furnished to the diagnosis of certain diseases of childhood, by the study of the external phenomena of respiration; but in order to comprehend the disturbances which arise in the exercise of a function, it is necessary to have studied the action of it in the physiological state. Moreover, there are few who have performed this task as regards the respiration of the newly-born; and, as a general rule, any pecularity which this function presents at this age is unknown.

We shall now proceed to treat of the normal respiration of young children, and we shall then return to the external characters which it presents in the pathological state.

Study of the Respiration of Children at the Breast.

The result of the respiratory movements is the revivification of the blood. They commence immediately after birth. The respiration becomes instinctively established; it takes place by virtue of influences as mysterious as those which surround generation, of which it is the necessary complement. Its action becomes combined with that of the brain and heart, already established in the womb of the mother, so as to form this indivisible and absolute trio, this vital tripod of Bichat, the indispensable base of the entire organism.

The respiration is not performed in the same manner at all ages; in the child who happens to breathe for the first time, as in the old man who is near terminating his existence. The newly-born infant, quite inexperienced, breathes instinctively as often as necessary, without regularity, as without method; it is interrupted at the least event, and is with difficulty quieted. It appears to essay its respiratory powers with an irregularity comparable to that which reigns in the movements of its arms. Towards the age of two years these irregular movements cease; the respiration becomes regular, and finally resembles that of the adult.

The respiration of the newly-born infant and of children at the breast

is then irregular; it is, moreover, incomplete, the lung being at this age more dense and less permeable to air than in subsequent years. These external modifications are accompanied by similar modifications in the tone of the respiratory bruits as ascertained by auscultation. It is then of the highest importance, before studying the diseases of the lung and the disturbances of respiration which accompany them, to be perfectly acquainted with the phenomena of normal respiration.

When the mechanism of respiration is considered, it is observed that it takes place by means of the muscles of the wall of the abdomen and of the diaphragm. The abdomen rises and sinks in consequence of alternate movements, described under the name of respiratory movements. The dilatation of the chest is feeble and is effected by the inferior ribs. It is the action of the diaphragm which constitutes the active part of respiration. It has received the name of abdominal respiration.

In the state of health the respiratory movements differ during waking and sleeping. When the child is asleep his respiration is tranquil, is repeated twenty to thirty times a minute; the movements of inspiration and expiration succeed each other regularly and without effort. During waking, this appearance is incessantly disturbed. The respiration calm, suddenly becomes intermittent, accelerated, and even hurried; then a period of repose arrives and all returns to the normal condition. These modifications are repeated a thousand times a day; they appear to result from an agreeable internal emotion, betrayed by the expansion of the features and by the smile, or by a distraction caused by external objects, for the attacked child remains with its mouth gaping, the breath suspended, which soon makes up for by precipitating its respiration. These modifications are produced in a still more decided manner at the time of the cries and sobs caused by suffering and anger. The number of inspirations is then very variable; we reckon twenty-five, thirty, and even thirty-five respiratory movements in a minute.

Auscultation demonstrates still more perfectly than inspection from a distance all these variations of frequency, of momentary suspension, of irregularity in the rhythm of respiration. Only it gives a notion of excess, relative to the bruits which the air produces in entering the lung.

It is necessary to use great precaution when it is wished to auscultate the chest of young children. It should be examined during the state of calm and at the period of the agitation. The child is placed undressed in his mother's arms, and is examined at a distance; then we approach and gently auscultate it. Soon the child, becoming cross, utters cries; we should profit by this to auscultate it afresh, for the symptoms are often modified in these different situations. There are numerous methods

of varying the examination; that which I have described is in my opinion the best. The child may, moreover, be left at the breast, and auscultated when it is in this position, but then the respiratory movements are too feeble, the air entering the lungs imperfectly, and the bruits are difficult to appreciate. In other cases the child must be placed flat on the belly on its mother's knees, or it should be taken in the hand and the chest applied to the ear.

It is generally observed, and every one repeats it, that the respiration of children is puerile, that is to say, that the inspiration is sonorous and roaring. "It appears," says Laënnec, "that in children the air cells are distinctly felt dilating to their fullest extent; whilst in the adults it might be imagined that they only half fill with air, or that their more dense walls cannot allow so extensive a dilatation."

This may be correct as regards children who have attained the age of two years, and we have been enabled to corroborate it; but in the newly-born infant and in the child at the breast this is no longer the case. The respiration is neither sonorous nor roaring, it is accompanied with a bruit of slight intensity, which possesses nothing soft in its character, is analogous to the bruit of hard respiration, and which it is impossible to refer to the complete dilatation of the air cells. We have directed very great attention to the study of this subject. We have daily repeated it, and we have never heard anything which bore resemblance to puerile respiration. This is explained by the difficulty which the air experiences in readily penetrating the lung, which is either caused by the density of the organ or by the construction of the pulmonary vesicles. The density of the lung diminishes with age, and at the same time the diameter of the vesicles increases, a circumstance favourable to the production of the puerile bruit.

A close relation exists between puerile respiration and resonance of the thorax. These two phenomena coexist. If one of them happens to be wanting, the other disappears. This might be readily imagined, since the rarefaction of the pulmonary tissue is the cause which produces both of them.

The chest of children at the breast is then but slightly resonant. This is a fact which may be easily verified. Nevertheless, the resonance varies much, even in the normal state. It is very feeble in healthy children, in those who possess the plumpness natural to infancy; it is more considerable in those who, without having any affection of the chest, have an emaciated thorax. It is very variable, and it presents singular alterations at the same moment, in the same child, without any derangement of health being present. Thus, on percussing the chest for a long time in succession, the sound obtained alternately increases and diminishes in intensity. It increases during inspiration, and diminishes, on the contrary, during expiration. This phenomenon

is a very curious one; it is very decided in the deep respiratory movements observed in children who are agitated and shed tears. The explanation of it is easy: the sound is clear in inspiration, that is to say, when there is much air in the chest; it is dull in expiration, when nearly the whole of the contained air has been driven out.

The direct examination of the chest should always be commenced by auscultation, and the chest should only be percussed after having accomplished this prior method. In fact, percussion agitates children very considerably, and it would be impossible to auscultate them advantageously afterwards.

The walls of the chest are subject to considerable vibrations at the moment of efforts, whether of the voice, the speech, or the cries. It is right to be aware of the normal force of these vibrations, in order to judge of their increase in pneumonia, of their diminution and of their complete disappearance in pleurisy. In this latter affection this symptom is one of the most evident that can be met with.

It results then from the physiological study of the respiration of children at the breast: 1st, that the respiration is not regular, and that we must not fall into error with respect to the phenomena of the frequency, the irregularity, and the intermittence of the respiratory movements, which it would be a mistake always to consider as the consequence of a pathological state; 2nd, that the respiration of the newly-born infant and of children at the breast is not accompanied by the puerile bruit which exists in children of a more advanced age, and that the absence of puerile respiration should not be considered as a morbid condition; 3rd, finally, that the results of the percussion of the thorax are uncertain if they are not well defined, since, in the normal state, the resonance of the chest is obscure.

Such are the ordinary phenomena of the respiration of young children in the physiological state. It was necessary to point them out in order to render what follows intelligible. We shall now treat of the important aids furnished to the diagnosis of certain diseases of infancy by the study of the external phenomena of respiration.

Of the External Signs of Respiration in the Pathological State.

In order to ascertain the force, the frequency, and the rhythm of the respiratory movements in children at the breast, for they have all *abdominal* respiration, it is especially necessary to examine the abdomen, stripped of clothing, from a distance.

This study is not only useful to the diagnosis of diseases of the chest; it is further indispensable to those who desire to obtain correct information of certain diseases of the abdomen and of the brain.

In the diseases of the chest, in bronchitis, commencing pneumonia,

pleurisy, the respiration is simply accelerated. Its frequency is in relation with the intensity of the inflammation; it does not present any sign peculiar to one rather than to another of these affections.

In confirmed pneumonia, on the contrary, the respiration is accompanied by external phenomena, highly important and exceedingly valuable, which are *often* the certain index of the disease. The respiratory movements are very frequent, without considerable efforts of the abdominal muscles and without agitation of the alæ nasi. From sixty to eighty inspirations may be counted in a minute. This extreme acceleration of the respiration presents a striking analogy with that of a dog from the chase. This state is perfectly well expressed by the term *panting* respiration.

Moreover, the disturbance of the respiratory movements is still further increased; these movements, less rapid than in the preceding case, are changed in their rhythm.

The respiration commences by an active and decided movement of groaning and jerking nasal expiration, followed by an inspiratory effort, after which a short moment of repose is observed. Each expiration is accompanied by lateral constriction of the base of the thorax, enormous projection of the abdomen, and sub-clavicular and sternal depression. To the *ensemble* of these phenomena I apply the name of *expiratory* respiration. Let the reader himself perform a decided expiratory movement, immediately followed by an inspiration, and he will perfectly comprehend what my words cannot express.

These external disturbances of respiration are in relation with certain movements of the face and nostrils to which we have already referred; they are indicated by a smothered groan, which escapes at each inspiration, and suffices to fix the attention on these characteristic phenomena of pneumonia.

Fresh observations will undoubtedly lead to the knowledge of the external signs peculiar to other affections of the chest; but at present it is impossible to dwell longer on this subject without losing ourselves in the midst of hypotheses. We will, however, point out one characteristic, drawn from the examination of the respiration, which possesses a certain importance in the diagnosis of pleurisy, and which may lead to the discovery of its existence. When this characteristic is observed, then a pleuritic pain is present. In these cases the respiration is *restrained*, it stops suddenly, and a quick almost convulsive effort is observed in the muscles of the chest, which appears to be painful, so far as we can judge by the contractions of the face which accompany it, and by the cry which the children utter at the same moment.

In some affections of the abdomen these external signs of respiration may be very useful in the diagnosis; thus I have as yet but twice

observed peritonitis in young children, and in these two cases one could have diagnosed the disease by the study of the respiration. It was *short*, *incomplete*, and *of a jerking character;* it appeared painful; the respiratory movements were short, feeble, and rather frequent; they rapidly succeeded each other, but were separated, at the end of six or eight inspirations, by a slow and deep respiration, capable of supplying the insufficiency of the preceding respirations.

I cannot affirm that this should always take place; observation alone can demonstrate this. In these children it is evident that there was some obstacle to the respiration and to the respiratory movements of the abdomen which could not freely distend itself. Each respiration was short and feeble; it was insufficient for hematosis, for, at the end of a certain time, the necessity of breathing, overcoming the obstruction of the respiratory movements, forced the child to make a deep and complete inspiration.

These external disturbances of respiration are so thoroughly in relation, on the one hand, with the anatomical lesions of peritonitis, and on the other, with the pain of the abdomen which in this disease hinders the expansion of the walls of this cavity, that it is impossible for us not to consider it an important sign in the diagnosis of this affection. It is, moreover, the only abdominal disease in which an appreciable modification of the external respiratory phenomena exists.

In the acute affections of the brain, at the time when the convulsive stage is about to appear, the respiration is *short*, *incomplete*, and *intermittent*. This sort of internal convulsion of the respiratory muscles is a characteristic symptom of acute meningitis, either simple or tuberculous, of encephalitis, and, in a word, of all the acute cerebral affections, but presents nothing peculiar as regards each of these affections.

In these cases the respirations are in turn slow or rapid, feeble or deep, regular or intermittent, silent or sighing. The child, that breathed calmly, suddenly hastens its respiratory movements, and stops entirely for eight or ten seconds; then it resumes them, and thus continues sometimes slowly, breaking off from time to time to utter a deep, sighing respiration, sometimes quickly, every now and then resting for some seconds.

As we have seen, the respiration presents external modifications peculiar to the diseases of the chest, the head, and the abdomen. They are perfectly distinct in these three orders of diseases.

We must then study them, not with the aim of restricting to these characters alone the knowledge of such or such a disease; but because it is not right that the physician should neglect any practical information which may in any way contribute to science that certainty which is so desirable.

We shall now proceed to consider the deformities of the chest. They are few in number. There is not one which has not been observed in the adult.

These deformities are singular. We have already pointed out that which is peculiar to rachitis; it is useless to return to it. The other deformities are the consequence of acute or chronic diseases of the lungs; they are definitive, and usually only occur on one side. I refer either to the constriction or the dilatation of the chest.

Dilatation usually accompanies acute pleurisy, when the effusion is considerable. It exists on the diseased side. The constriction, on the contrary, is observed a long time after the cure of the disease, and when all the liquid is reabsorbed. These semeiologic characters are common to the pleurisy of childhood and to that of adults.

In chronic pneumonia and in tubercular pneumonia, the pulmonary tubercles also bring on contraction of the chest. This is a fact well established by the researches made amongst the old. Is it well demonstrated in the diseases of the child? This may be doubted. However, we have observed at the Necker Hospital, in the practice of M. Trousseau, a little child very evidently phthisical, with excavations in the right lung; it was provisionally cured at the end of two years;* since that period I have met with him, and this side of the chest was found to be considerably narrower than the other. This fact is, I confess, insufficient to establish in a general manner the existence of the narrowing of the chest in chronic affections of the lungs, but it possesses sufficient interest to be alluded to.

Besides these partial, slow, and *definitive* deformities, others exist which are general, but *transient*, like the *acute* affection which causes them. Thus, by slightly straining the value of terms, we may include, under deformity of the chest, the changes of form which it undergoes under the influence of the muscular contraction in very intense dyspnœa. In well characterized pneumonia, each expiration is accompanied by a considerable lateral constriction of the base of the thorax, an enormous projection of the abdomen, and by a violent sinking of the sub-clavicular and sternal depressions. This deformity is pathognomonic of the pneumonia of children at the breast. I ought not to pass it over in silence; it exists on both sides, it is consequently general; moreover it is transient, like the dyspnœa which it accompanies.

* The symptoms revealed by auscultation had disappeared; a slight cough still indicated the affection of the thoracic organs.

CHAPTER VII.

EXAMINATION OF THE CIRCULATION.

It is impossible to exxmine carefully the heart of children at the breast, without immediately provoking an agitation difficult to calm, and one which increases the frequency of the pulsations of this organ. This study fortunately is not very important, for diseases of the heart are very rare in young children, and on the other hand, we can appreciate the frequency of circulation by the rapidity of the pulsations. We shall consequently proceed to study the pulse, and we shall arrive at the knowledge of fevers and of febrile reaction.

On the Frequency of the Pulse and on Fever in Children at the Breast.

We no longer live in an age in which the seat of disease is determined by the modifications of the pulse, which no one could appreciate now-a-days. The ideas of Galen on this head are abandoned, and the whimsical expressions made use of in order to distinguish the numerous varieties of the pulse, have finally succumbed under the weight of the ridicule cast upon them on the stage. Another system, of which Bordeu was the promoter, rose up on these ruins, and when this physician published his researches, it was for the time thought sufficient to recognize the cephalic, nasal, guttural, pectoral, stomachal, intestinal, hepatic, hæmorrhoidal pulse, &c., the pulse of irritation and the pulse of non-irritation, with numerous others, in order to specify the morbid states which correspond to these different denominations. Such an excess of sub-division in a subject not divisible to this extent ruined the doctrine. Modern physicians did not wait for the criticism and the raillery of another Molière, they themselves exercised justice on those erroneous assertions which, by spreading, could only throw discredit on science.

Thenceforth, they were satisfied with feeling the pulse in order to appreciate the principal sensations it communicates to the fingers, to recognize its feebleness or its force, its fulness or its smallness, its regularity, &c., and they have finally decided on specifying its rapidity by figures. This is the best manner that could have been adopted. We now confine ourselves to feeling and counting the pulse in adults.

In children at the breast the feeling of the pulse is nearly impossible. It must be counted. We can scarcely recognize either its force or

its feebleness, its fulness or its hardness: intermission is the only phenomenon on which there can be no doubt; it is also the only one which presents any value.

We shall first proceed to determine the frequency of the pulse in young children in a state of good health, so as to possess an indispensable limit of comparison in the study of the frequency of pulsations in the course of diseases; we shall then treat of some of the characteristics which the pulse presents at this period of existence.

The numeration of the pulse scarcely presents more difficulties in children at the breast than in adults. The pulsations are sometimes difficult to appreciate when they are feeble; the least movement of the fingers or of the hand of the child permits them to escape us, but with a little patience we may always succeed in counting them.

Authors who have paid attention to this subject have arrived at very different results. Thus, Haller fixes the number of pulsations of a child at 140 a minute. Sœmmering very properly gives figures varying according to the ages of children—the pulsations number 130 or 140 in the first year, 120 in the second, 110 in the third, &c., and 80 at the period of puberty. Dr. Gorham, who appears to have carefully studied this subject, has observed in children from one day to one week old, a minimum of 96 and a maximum of 160. In M. Valleix's treatise we find the numbers 76 and 104, extreme figures taken in children from two to twenty-one days old, and in children from seven to eight months the average figure of 124. It is Billard who, in his *Recherches*, has observed the most extensive variations: in thirty-nine children, of from one to ten days, he he has observed a minimum of 80 and a maximum of 180. If no error exists, this result may possess an immense importance, as we shall see further on. The figures published by M. Trousseau nearly approach those of Gorham; he has found a minimum of 96 and a maximum of 152, in children from fifteen to thirty days old.

It seems a difficult matter to explain such differences in the observations of men equally trustworthy. I do not believe that any error exists on the part of these physicians; for Haller, Sœmmering, and Billard were not ignorant that in the numeration of the pulse we should take into consideration the acceleration caused by internal emotion, agitation, muscular movements, and alimentation; in fact, by numerous other circumstances the value of which we all know how to estimate, and which it is useless to indicate here. They were aware that allowance should be made for these influences in their observations in the adult, why should they have neglected them in children? I believe, consequently, in the correctness of the numbers given by these authors, who are sufficiently enlightened not to be considered, without injustice, as superficial or inattentive observers.

If these differences are real, and we cannot doubt it, they must be referred to the age itself of the children, and we must conclude that at this period of existence the arterial pulsations are not yet regulated as they are at a later period. It is this, moreover, which ought to result from the facts about to be detailed.

MM. Jacquemier and Lediberder, in their interesting researches, have calculated the frequency of the pulsations of the heart in the fœtus while yet in the mother's womb, at the last term of pregnancy, in the fœtus at the moment of birth, and in children at the first day of existence. In fifty-one subjects of the first category, that is to say, in the fœtus while yet in the mother's womb, M. Jacquemier has observed from 108 to 160 pulsations in a minute, and from 96 to 156 in children near twenty-four hours old.

M. Lediberder could only count the pulse in the first minute of life in six children, and he has observed from 72 to 94 pulsations. This number rapidly increased after birth, doubtless under the influence of the establishment of the functions. At the fourth minute it became raised to the enormous amount of 140 and 208.

The pulsations of the heart, then, very frequent in the course of fœtal existence, are much diminished at the moment of birth, and become slightly accelerated in the first day of existence.

In children of more advanced age it is necessary, in order to effect a numeration of the pulse, to make choice of subjects in good health; they should be taken in a moment of calm, a long time after lactation, their attention being distracted by the sight of an object which interests them, thus preventing any momentary acceleration of the circulation. Separate observations should also be made on children awake and on children asleep. Lastly, if a complete table is desired, the frequency of the pulse should be ascertained in children who are agitated, and in those who obstinately cough, weep, or cry.

M. Valleix, in his work,* has only especially referred to children from two to twenty-one days old; we shall presently allude to the results which he has obtained.

It is impossible for us to profit by the tables which the second part of this treatise contains, for we there find children of seven months and those of six years united in a single class. Moreover, if we would appreciate the influence of age on the acceleration of the pulse, we must proceed in a different manner, and treat separately, in little categories, children of six months, of one year, of two years, and so on. It is true M. Valleix thought he could dispense with this process by taking the mean of the age of all the children submitted to his observation, and by calculating the mean of the pulsation of the heart. But this method is imperfect, and would necessarily lead to error. The

* Valleix, *Memoires de la Société médicale d'observation*; t. ii.

author referred to, made observations on thirty-three children from seven months to six years; he took the mean of the age which was equal to twenty-two months and five days, and he obtained for the mean of the pulsations of the heart the number 124.20.

It is impossible to disfigure the facts more completely. It is evident that not one of those children was, at the time of observation, twenty-two months and five days old, and that not one of them could have had 124.20 pulsations.

As to the results relating to the pulsations of the newly-born, they differ from all the known results. In thirteen children, M. Valleix has found the extreme figures 76 and 104, and for the mean 87 pulsations. These results are extraordinary it is true, but they must be admitted, for it is difficult to believe that so distinguished a physician as M. Valleix could have deceived himself.

M. Trousseau, in his investigations on the pulse, has taken the precaution of classifying the children by age and by sex, in order to unite in his favour all the desirable conditions of accuracy. In a large number of children, from eight days to two months old, he has observed the extreme figures of 96 and 164, and of other ages, from two months at least, and twenty-one months at most, the figures 96 and 160. The means of his calculations are 137 pulsations in the first and second month; 128 from two to six months; 120 from six months to one year; 118 from one year to twenty-one months.

The maximum, then, of the frequency of the pulse is observed in the first month of existence, and the minimum in the last months of lactation.

The sex does not really possess any influence on the acceleration of the pulse which is, at the time of birth, nearly as frequent in girls as in boys. At the end of the third month the pulse assumes, relatively to the sex, the tenor which it will preserve through the whole life, that is to say, it is decidedly more frequent in girls than in boys.

"But," as M. Trousseau observes, "if the influence of age is so slight, if that of sex is more so, the influence of the state of being awake and the state of sleep is such that it should never be lost sight of by the physician who feels the pulse of a child. This influence does not alone make itself felt in children who are already slightly intelligent, who *may* be influenced by the sight of the physician who examines them, but even by those who, only some days old, appear entirely insensible to the external world; thus in a child eight days old, half awake, the pulse gave 140 pulsations, and 128 in the same child perfectly asleep. The following table will give more value to these assertions:

MEAN NUMBER OF PULSATIONS IN THIRTY CHILDREN FROM FIFTEEN DAYS TO SIX MONTHS OLD:

	Pulsations.
Awake . .	140
Asleep . .	121

MEAN NUMBER OF PULSATIONS IN TWENTY-NINE CHILDREN FROM SIX MONTHS OLD TO TWENTY-ONE MONTHS:

	Pulsations.
Awake . .	128
Asleep . .	112

"The difference is still much more decided when the child is afraid, becomes agitated, cries, and struggles with the physician who feels his pulse. The pulsations, which during sleep were 112, may increase to 160 and even 180.

"These details were necessary in order to put the physician on his guard against the variations which the pulse may experience in the state of health, by the sole fact of the agitation of the child."

The observations of Dr. Gorham almost entirely agree with the results we have just read. This physician, like ourselves, has met with very great individual differences in his investigations on the pulse of children. He has observed the extreme numbers of 96 and 160, with many intermediate figures. The mean has been 123 in children one day old, and 128 in children from one day to one week. The influence of sleep has also been very perfectly proved by this physician, who, from 128 pulsations, has seen them lose a considerable number, and finally arrive at 108 a minute.

To recapitulate, then: in children at the breast the pulse presents a considerable frequency; it is far from being regular, as it would be at a later period; it varies much according to the subjects; its normal quickness may be estimated at 100 or 150 pulsations a minute.

The mean number of 118 to 120 is that which is usually met with. Above two years of age, the mean varies between 92 and 100 up to the seventh year.

The following is a table which recapitulates in a few lines all the extreme numbers we have just referred to:

	Pulsations a minute.
In the womb of the mother . . .	108 to 160
In the first minute of existence . . .	72 to 94
At the fourth minute of life . . .	140 to 208
From eight days to two months . . .	96 to 164
From two months to twenty-one months .	96 to 160
From two years to five years . . .	92 to 120
From five years to eight years . . .	84 to 110
From eight years to twelve years . .	76 to 104

The pulse diminishes in frequency in proportion as the last months

of lactation draw near, but the decrease takes place in an insensible manner.

The sex does not appear to possess a very evident influence on the degree of the frequency of the pulsations. Nevertheless, at the end of the first year the pulse is in general more frequent in girls than in boys.

The distraction of the state of being awake is sufficient to give the pulse a decided acceleration. When the children are asleep, their pulse diminishes from fifteen to twenty pulsations.

The rapid and voluntary muscular movements, the internal involuntary muscular movements which accompany cough, crying, moral emotions, &c., communicate a violent impulsion to the pulse. It becomes raised from fifteen to thirty and even forty pulsations.

Alimentation produces the same result, but to a more feeble extent. Nevertheless, the pulse of the child which has just sucked is decidedly quicker than before taking the breast.

Lastly, according to the researches of MM. Knox and W. Guy, it would appear that the pulse becomes slower every evening at night-fall, and that it resumes its accustomed rapidity at the break of day. However, if this assertion is well founded, it forms a very evident contrast with that which is observed in the state of disease. In fact, most sick children often present many quotidian febrile exacerbations, and one of these always returns towards the evening. As it is seen, night possesses an entirely different influence over the pulse in the state of health to what is observed in the state of disease.

On Fever and on Febrile Reaction in Children at the Breast.

Great care has up to the present time been taken in order to determine the influence which age exercises on the anatomical manifestation of diseases, on their progress, and their terminations. These questions belong to special pathology. Not one of them has been neglected, not one of them should be so.

There are others not less interesting to investigate, which constitute a portion of the general pathology of children, and which have been less attentively studied. Thus, fever and febrile reaction have not been examined with much care, for no author has pointed out all the peculiarities which these phenomena present—peculiarities very important to recognize, as we may be convinced.

If the anatomical lesions of the diseases of infancy, if their symptoms, their progress, and their terminations differ from the termination, the progress, the symptoms, and anatomical alterations of the diseases of the adult, it is not at all probable that fever—that vital phenomenon—presents itself under the same form in the adult and in the child.

We have observed, in the preceding chapter, the differences which separate the extreme numbers presented by the pulse in the normal state. It is, then, impossible that the frequency of the pulse can alone possess a great value in the determination of the febrile state of children at the breast. This sign would be insufficient did not other phenomena, such as the increase of the heat of the skin, tend to give it importance.

How, then, can we recognize fever in children at the breast? What is its manifestation?

Fever is characterized by the increase of the superficial and deep-seated heat of the body, combined with a considerable acceleration of the pulse, and with a nervous agitation, which is described under the name of restlessness.

The acceleration of the pulse, taken alone, unless, however, it is excessive, cannot possess any semeiologic value; it is necessary that it should be accompanied by a rather considerable development of the heat of the skin. The presence of restlessness, then, becomes characteristic.

When fever becomes established in children at the breast, the following phenomena are observed: the patient appears sadly depressed, it becomes peevish, readily weeps, and seeks for rest; if it sleeps, and this is the usual case, it is observed to bite its lips, toss its head, and agitate its limbs, which are repeatedly, but slightly, convulsed. Their sleep is light—broken by the slightest noise; they wish to suck, and abandon the breast immediately after having seized it; if they are of more advanced age, they give themselves no rest until drink has been given them; the mouth is hot, and the tongue continues moist: it never becomes thickly coated as in the adult. The temperature of the skin increases, and becomes sometimes raised to a very considerable extent. The face is flushed, but, except in individual cases, it never presents a very decided redness. At the same time, the pulse is accelerated, it assumes so much the more frequency in proportion as the child is agitated and restless.

Up to this point the phenomena of febrile reaction in children do not differ, to any great extent, from the same phenomena observed in the adult. But in the latter, perspiration succeeds fever; rigors precede it. Is such the case in children at the breast? This is what we will now proceed to investigate.

Rigors do not occur in young children; they are never observed to shiver as if they experienced an intense degree of cold. Even in intermittent fevers rigors do not exist. Thus, I have observed the commencement of the attack in several young children: not one of them experienced shivering. This cold stage is replaced by several phenomena which indicate the concentration of the powers; it is

betrayed outwardly by a considerable paleness of the face, by the decolouration of the lips, and by a very manifest bluish tint beneath the nails. This is all that is possible to prove; in one case, but this was a child two and a half years of age, and I do not refer to children of that age, the rigor resembled that of the adult. This phenomenon does not appear in the course or at the commencement of inflammatory affections; nothing is observed at all approaching it—not even the symptoms of concentration to which we have just alluded.

The absence of rigors in children at the breast is probably a result of the age of the subjects; when we study, comparatively, the febrile reaction in children of this age and in adults, this is an important difference to point out.

The temperature of the skin becomes raised from one to two or three degrees; it should be studied on the body and in the axilla, rather than on the arms and on those parts which, being exposed to the air, are considerably cooler. The perspiration is never so abundant in children as in the adult; the linen is never considerably damped by it, it is rather a moisture than an abundant cutaneous perspiration. In the intermittent fevers which I have had the opportunity of observing, this phenomenon has been so very trivial, that the mothers have paid no attention to it; such would not have been the case if the perspiration had been at all considerable.

We have attempted to characterize fever by studying the phenomena which developed themselves during an attack. This is not all; this anatomical description would not suffice us, we must treat of the febrile reaction, considered in a general manner in the course of the diseases of the first stage of childhood.

In adults, when an acute affection declares itself, the fever, its inseparable companion, manifests the presence of it; it continues as long as the disease which is the cause of its appearance, and disappears with it. It exists in a continued manner and often presents a quotidian paroxysm at the approach of night. There are diseases, however, in which the existence of this exacerbation is not well characterized.

In children at the breast, the fever which accompanies acute diseases does not always maintain itself to the same degree; it lessens, soon afterwards to increase; it does not assume the true continued type; for it presents not only one but many paroxysms a day. Thus, in the course of entero-colitis and of pneumonia, it is not rare to hear of mothers speak of two or three attacks in the day, that the child's skin had become burning, and that during this period it was very restless.

The febrile paroxysms are always rarer at the commencement of acute diseases than during their continuance. At this period, the inflammatory excitement is weakened and the exacerbations become very evident.

It is very easy to prove this phenomena in chronic diseases, but here also it presents a difference which it is important to point out. The fever passes from the continued type with paroxysms to the intermittent type; this is the case with chronic pneumonia, in pleurisy, in chronic enteritis, &c. The children appear calm enough in the morning, they have little or no fever, and they experience in the middle of the day and at night an attack characterized by the phenomena previously alluded to. These attacks are quotidian, irregular, and appear sometimes at one hour, sometimes at another. They can only be compared to the attacks of hectic fever in adults.

In fact, fever, in children at the breast, is a morbid state which must not be judged of from the acceleration of the pulse, but from the increase of the cutaneous heat and from the nervous agitation of the patient.

At this age, fever is never preceded by rigors and tremblings; the perspiration which terminates it is rarely very abundant.

The continued type of fever is rare in the acute diseases of young children, there are decided remissions and very marked paroxysms.

In chronic diseases the fever is nearly always intermittent.

CHAPTER VIII.

ON CALORIFICATION IN NEWLY-BORN INFANTS.

Some learned physicians admit *caloricity* in the number of vital properties; that is to say, the property possessed by certain animals which develop caloric, and preserve a temperature of their own, independent of the surrounding medium. They are of opinion that it is in virtue of this property that man can advantageously withstand cold and heat, and possesses the power of resisting this grand law of the equilibrium of caloric which is that of all inanimate bodies.

Caloricity is, in fact, a property of living bodies which emanates from the nervous system and from its influence on the physical and chemical phenomena of the economy.

Man possesses a deeply-seated temperature, always the same when in a good state of health, and he easily resists the heat and cold of the atmosphere. His superficial temperature alone is modified by this double influence.

The same is not entirely the case as respects young children. In the first days of their existence, caloricity indeed gives them a proper temperature nearly equal to that which they should present at a later period, but they differ from adults in this respect, that their resistance to cold is infinitely less marked and that a fatal lowering of temperature

is easy and possible, if they are not sufficiently protected against this accident by the attentions of their mother or of their nurse.

Besides this influence of age on caloricity and on the force of resistance to cold, there is also another influence, sometimes a considerable one, exercised upon this identical property by diseases. This at least results from the researches of Haller, Martine, Hales, Hunter, MM. Despretz, Becquerel and Breschet, Bouilland, Donné, Andral and Gavarret, Roger, Mignot, &c. Let us briefly consider that which is peculiar to young children.

In the study of their animal temperature we must distinguish that which relates to the superficial temperature of the body, that is to say, the very variable cutaneous temperature, from that which relates to the proper temperature of children, that is to say, their deeply-seated temperature which, in the physiological state, always remains very nearly the same.

There is nothing so variable as the cutaneous temperature of children. It rises and falls in the exposed parts in proportion as the external temperature rises and falls, and this in a very different manner according to the diversities of the infantile idiosyncrasy. There is nothing to be stated on this point which is not well known to every one. The most feeble and the most delicate children are those which most readily become chilled; sometimes also this temperature is modified in the horripilation of fever, and in a local manner in certain cases of gangrene, all which circumstances are quite evident.

It is especially important to be aware of the modifications of the deeply-seated temperature by the very fact of age or of disease. This temperature is ascertained in the axilla by means of a thermometer. The general statement was for a long time thought correct, that the temperature of new-born was lower than that of full-grown animals. This was the result, in fact, of several observations made by Haller, MM. Villermé and Milne Edwards,* M. Despretz; but this conclusion is premature, and on this point no law can be laid down. The temperature proper to children at the moment of birth, varies as much as the power of their constitution, and these are only isolated individuals, of a different nature, of whom we cannot make a reckoning; for then we might just as well put equal value on a sous and louis d'or, under the pretext that they are equally money. Thus, in the tables of M. Roger, we observe that weakly children have a temperature of 89.6° Fah. only; others 93.2; others 96, which is also the figure of M. Despretz; then 96.5; 96.8; 97. 98.6; 99, a number exceeding by one degree that which the mother presented. The same was also the case in the observations made by M. Racle, and related in the excellent work of M. Roger.†

* *Annales d'hygiène publique*; Paris, 1829; t. ii, p. 291.

† *Archives de médecine*, 4e *série*; t. iv, p. 117 *et seq.*

At the moment of birth, then, the deep-seated temperature of children is variable, in relation with the infantile idiosyncrasy. Inferior to the normal temperature in weakly children, equal to it in well developed children, exceeding even, in some cases, the ulterior normal temperature of the child, and even the temperature of the mother at the time of her confinement, there is no fusion to be made between these different results, no mathematical mean to be deduced, no law to be laid down.

Some minutes after birth, the temperature of the newly-born becomes lowered, it loses two or three degrees of heat, and as M. Roger very justly observes, "This refrigeration increasing would probably equal that of young animals isolated from their mother, if the feeble creature were deprived of the multifarious cares its nakedness and helplessness require." This is what Edwards has met with in young birds eight days old, taken from their nest; in place of 104° and upwards, which represented the amount of their normal temperature, they did not possess more than 95.5 to 96.8 degrees; isolated from each other, they lost seventeen degrees in the space of one hour, and remained two degrees below the surrounding air.

From the day after birth the animal temperature resumes its physiological level, and there it persists, with the exception of slight oscillations, as long as health continues. M. Roger has found for the normal mean of thirty-three newly-born infants, from one to seven days old, the mean 98.6, and for twenty-five children of from four months to fourteen years old, the mean of 99°.

In the state of disease the caloricity sometimes remains in its normal condition, but it is more frequently observed to be exaggerated; then the deep-seated temperature is raised, or, on the contrary, which is more rare, it is diminished, and the deep-seated temperature is lowered. From thence arises a division of the diseases into three groups—of febrile disorders with increase of temperature, non-febrile diseases with normal temperature, and algide diseases with lowering of the temperature.

I do not wish to enter into the details of the different amounts of increase of temperature observed in the diseases of children. These results interest only the curiosity of physicians, and at present prove nothing peculiar for each malady. They demonstrate—and this is a fact of the highest importance in pathology—they demonstrate the truth of the law laid down by MM. Bouilland, Andral, and Gavarret, to the effect that there is no fever without increase of the deeply-seated temperature. This, then, is the conclusion of all the facts of elevation of temperature in diseases. In the newly-born infant, as in the adult, whatever may be the cause and the nature of the disease, variola or pneumonia, scarlatina or phlegmon, typhus or burn, increase of the temperature exists, not because there is burn, typhus, variola, pneumonia,

but in consequence of the fever and because the febrile state has manifested itself. This increase of the proper temperature appears with the fever, increases and declines with it, and disappears at the same moment. It scarcely ever exceeds the normal limit more than seven degrees, and attains as a maximum 108.5°, precisely as happens in the adult.

In a great number of diseases the caloricity does not seem to be modified, and notwithstanding serious and even fatal attacks, so long as fever does not supervene, the proper temperature of the body of the children is not changed. It remains within the ordinary limits, or very close upon the normal amount. This is the case in chronic diseases of the brain, of the lung, of the intestine, and of most superficial or deep-seated scrofulous affections.

Lastly, there are diseases of infancy which may be termed *algide*, in consequence of the considerable diminution the proper temperature of the body undergoes. In these cases, the caloricity is nearly annihilated, and the children rapidly die without it being possible to restore warmth. One of them, *sclerema*, has been termed by M. Roger, *algide œdema*, and presents this phenomenon in the most marked degree. It will be observed, in the very interesting table published by this author, that the temperature, constantly sinking below the normal mean, descends to 86°, 77°, 74°, and even 71° Fah., that is to say, twenty-seven degrees below the usual temperature.

At other times these cases consist of atonic pneumonia without fever, enteritis without any febrile reaction in extremely feeble newly-born children, only a few days old, having suffered from insufficient nourishment, and present, in fact, with a considerable alteration of the pulse, a lowering of the temperature without any trace of sclerema. M. Mignot, who has related several facts of this kind, has shown that, in these cases, the temperature may sink eight or sixteen degrees, to 87° and even 82° Fahr. These are very curious facts, and which we cannot reflect upon too much, for they demonstrate the important part which the primary force and the generative impulsion play in the exercise of caloricity, and in the proper temperature of young children.

Is it not, in fact, the organic imperfection of the encephalon and of the whole nervous system which should account for the feeble development of newly-born children, the absence of febrile reaction, that is to say, the want of vitality, of heat and of power, that is observed in certain cases among them? Is there any other cause which can explain similar phenomena? Assuredly not. Besides this febrile reaction which is wanting in some, and which proves the feebleness of the morbific impressions, is it not exaggerated in others placed in opposite circumstances, and do we not observe the fever express the activity of the vital reaction, and the preliminary existence of these very morbid impressions? Lastly,

is it not known, from the recent experiments on the nervous system, that the heat of a part is increased or lowered at will by acting on the great sympathetic or on the nerves of organic life? In fact, if, as M. A. Bernard has indicated, in an animal the branch of the great sympathetic which unites in the neck the cervical ganglion with the inferior ganglion be divided, there then results on the whole side of the face and in the corresponding ear an elevation of six, eight, and even nine degrees in the temperature which, added to an active congestion, thus continues for several days and disappears. The same is the case after the puncture of the spinal cord at the origin of the pneumo-gastric nerves, as regards the temperature of the liver and of the kidneys, which is very decidedly increased. On the contrary, when we act on the nerves of animal life, and when a section of the nervous cord of a limb is performed, the temperature of this limb is always decidedly lowered.

It is then, in fact, to the previous influence of the general nervous system that the exercise of the caloricity and the production of the superficial and the deep-seated temperature should be referred. The feeble degree of development, or the imperfection of this system, leads to the *algide condition*, and its physiological power or its morbid exaltation determine, on the contrary, a quantity of heat necessary to the support of the health, or that pathological exaggeration which characterizes fever.

APHORISMS.

59. The diseases of the infant approach those of the adult by an analogy which is founded on the seat and on the denomination; but they differ considerably in form, evolution, reaction, and termination.

60. Age expresses the degree of the power which proceeds from impregnation, its force and its future, as the figure on the sundial expresses the dawn, the height, and the decline of day.

61. The newly-born infant, before arriving at an independent existence, undergoes, externally, the remainder of a creation; the first portion of which is accomplished in the mother's womb.

62. Newly-born infants possess but little resistance to external impressions, and a quarter of them die before the end of the first year.

63. The newly-born infant brings with it diseases which should not burst forth until the end of many weeks, months, or even years. These constitute the hereditary diseases.

64. Infants, and children at the breast, are possessed of special opportunity necessary to the development of several diseases, particularly ophthalmia, croup, eclampsia, diarrhœa, erruptive fevers, &c.

65. Diseases are only transformed impressions.

66. In the first stage of childhood, the material lesions are less

purely inflammatory than in the second stage; and the suppuration of the tissues is then less frequent, and of a less laudable quality.

67. The sub-acute and the chronic form of diseases are more frequent in the child than in the adult.

68. In the first stage of childhood there is no relation between the intensity of the symptoms and the extent of the material lesions.

69. The most intense fever, with restlessness, cries, and spasmodic movements, may disappear in twenty-four hours without leaving any traces.

70. The diseases of childhood usually betray themselves, externally, by a collection of characters sufficiently significant to be recognized by all physicians.

71. In the first stage of childhood, the yellow colour of the skin, of the selerotic, and of the under surface of the tongue, always announces an affection of the liver.

72. The red, sudden, fugitive, and intermittent colour in the face, accompanied by fever, is a symptom of acute cerebral disease.

73. Apyretic cyanosis indicates a disease of the heart, or the patency of the foramen ovale.

74. Cyanosis accompanied by fever is a sign of asphyxia from croup.

75. The rapid decolouration of the face and of the lips, with excavation of the eyes, is a sign of intestinal disorder.

76. The alteration of the features by a progressive paralysis of the eyelids, nose, and muscles of the face, with or without strabismus, indicates an affection of the brain, or simply of the facial nerve.

77. The alteration of the features, by the enormous disproportion of the face and cranium, is a sign of chronic hydrocephalus.

78. A young child attacked with fever, who breathes rapidly through the nose and heaves its abdomen, is attacked with acute pneumonia.

79. The decrepitude of the face of a young child is the sign of a pulmonary tuberculous affection and of a chronic enteritis.

80. The strabismus which succeeds fever and convulsions is the symptom of an acute meningo-encephalitis.

81. The primary strabismus, in a child of good health, is a simple muscular paralysis.

82. Redness of the eyes and lachrymation, accompanied by fever, indicate the incubation of measles.

83. The child who is frightened or attracted by an imaginary object, who would avoid it or seize hold of it, is threatened with cerebral disease.

84. A young child who is continually putting its hands into its mouth, is suffering under laborious dentition.

85. A child of two years old, who cannot stand upright, whose superior fontanelle is open, is affected with rickets.

86. A child who has rapidly lost its plumpness, whose flesh is soft and flabby, has had, and is probably labouring under, diarrhœa.

87. The feeble cry of a newly-born child, indicates its deficiency of vital strength and its imminent death.

88. An acute cry, very strong and intermittent, is usually a sign of hydrochephalus.

89. The muffled, hoarse cry, indicates the last stage of croup.

90. A large-sized abdomen, very disproportionate, observed in a child from one to two years old, indicates rachitis or chronic enteritis.

91. *Expiratory respiration*, groaning and jerking when a child is calm, indicates acute pneumonia.

92. Respiration suddenly stopped at each effort, by a sort of convulsive spasm, is a sign of acute pleurisy.

93. Short, incomplete, and painful respiration, mixed with a long breathing at every eight or ten inspirations, is a sign of acute peritonitis.

94. Short, incomplete, and intermittent respiration, is the sign of simple or granular meningo-encephalitis.

95. The deep lateral constriction of the base of the thorax at each respiratory movement, accompanied by fever, is a sign of acute pneumonia.

96. Permanent lateral fluttering of the thorax is a sign of rachitis.

97. At no period of existence is the heart so impressionable and so varying as in infancy.

98. Moral impressions quicken the pulsations of the heart as much as the febrile state.

99. The frequency of the movements of the heart occasioned by fever is always accompanied by an increase of the deep-seated temperature of the body, and it is this which distinguishes it from the acceleration which is due to a moral cause.

100. Fever manifests itself by the acceleration of the pulse and the elevation of the deep-seated temperature of the body of children.

101. Fever, present or past, always leaves on the tongue of children a red dotting, which is due to the erection of the papillæ, and which remains as the last trace of this organic movement.

102. A child sad, depressed, and dull, weeping readily, seeking a place to be quiet and sleep, biting the lips, tossing about its head, agitating its limbs which are occasionally started by small jerks, is labouring under fever.

103. Rigors are extremely rare in children at the breast.

104. Pallor and a general cutaneous chilling replace rigor with trembling, in the fever of very young children.

105. Abundant perspiration is not observed in young children; it is entirely replaced by moisture.

106. Fever always presents considerable remissions in the acute diseases of young children.

107. In the chronic diseases of infancy, the fever is almost always intermittent.

108. A high fever acts upon the secretion of urine, diminishes its quantity, concentrates its elements in a small quantity of water, and soon renders it irritating to the excretory passages.

109. A violent fever dries up the secretion of tears.

110. The deep-seated temperature of the body, measured in the axilla, becomes raised from two to six degrees in the acute febrile diseases of children, under the exclusive influence of the fever and not of each disease in particular, precisely as observed in the adult.

111. Calorification is in relation with the force of the constitution of infants.

112. Calorification supported by the food and covering is so easily lost in feeble and attenuated infants, that death by cold is the consequence of it.

113. Calorification is always very much diminished in sclerema or induration of the cellular tissue of infants.

END OF PART II.

Part III.

SPECIAL PATHOLOGY OF INFANCY.

BOOK I.

PHYSIOLOGICAL AND PATHOLOGICAL PHENOMENA CONSECUTIVE TO BIRTH.

Separation of the Umbilical Cord.

The detachment of the cord completely separates the newly-born infant from all connection with fœtal existence. It is accompanied by phenomena and symptoms which it is useful to know.

This detachment takes place more or less quickly, according to the subjects, according to the nature of the cord, and also according to the particular constitution of the children. Thus large, soft, and fat cords shrivel slowly, and often suppurate at their base before separation; on the contrary, thin, small cords dry up early, become transparent like parchment, so that the dried vessels which they enclose can be distinguished, and are separated rather early without suppuration.

The cord shrivels from the first to the third day, and desiccation rapidly follows. It is only completed at the end of twenty-four hours, three, four, and five days. It is equally observed in the gelatinous matter of the cord, and stops at the level of the cutaneous swelling. Then the cord becomes detached with or without suppuration, leaving a complete cicatrix beneath it.

The most curious part of this phenomenon of desiccation is the fact that it is so evidently under the dependence of the phenomena of life. It is not observed in children who die during parturition; the cord, far from becoming dry and separating, becomes decomposed at the end of several days, the vessels remain permeable, and capable of receiving a penetrating injection, as Billard has informed us. This fact is important in a medico-legal point of view, when it is endeavoured to find out if a child has lived one, two, or three days.

Haller and Munro attribute the detachment of the cord to be a kind of gangrene. Gardien considered it as due to the constriction of the epidermis; Chaussier, to an inflammatory process, and Billard to the traction of the abdominal muscles which separate the navel from the dried portion of the cord.

It is evident that here a complex process takes place precisely similar to that which results from the torsion of arteries; a certain portion of the vessel shrivels, dies, and becomes separated from the living parts by means of a more or less evident inflammatory process, so as to be influenced by the slightest external traction.

This process of separation usually takes place without complication, and occasions a slight oozing, that is to say, an inconsiderable suppuration, which is observed on the small and thin cords, but is accompanied by a more abundant suppuration, in some cases, if the cord is of a large size. It is sometimes complicated by serious hæmorrhagic or inflammatory symptoms. Underwood, Villeneuve, Richard (of Nancy) Burns, P. Dubois, Thoré and Mansley have seen hæmorrhage occur from the navel, and death to be the consequence of it. These instances are very rare, and merit the careful attention of practitioners. The following is a case related by M. Mansley. A male child born at full term, after a natural labour, well-conditioned and presenting all the symptoms of the most perfect health, was at first attacked, some days after his birth, by *icterus neonatorum*, for the treatment of which mild purgatives were administered. One morning the mother perceived that the child's linen was spotted with blood; the cord had separated spontaneously, without violence, on the fifth day. Being immediately sent for, M. Mansley found the circumference of the navel in its normal condition, but the bottom of the hiatus was occupied by a putrescent substance resembling the debris of cellular tissue mixed with blood; the part having been carefully washed, it was ascertained that the drops of blood oozed from a small opening. This was several times touched with a stick of nitrate of silver; but in vain, the hæmorrhage was not diminished; the reapplication of the caustic, long-continued compression with the thumb, the actual cautery, the use of styptic powders, nothing could stop the hæmorrhage. Ligature, which was also thought of, became impossible in consequence of the depth of the hiatus. The child, died exhausted, at the end of forty-eight hours.

Up to the present time, hæmorrhage has always occurred after the separation of the cord, at the end of seven, nine, eleven, and even thirteen days after birth. The blood flows slowly in an intermittent manner, and not *per saltum*, indicating the nature of an arterial jet.

It has been several times observed in children labouring under *purpura*, and it is a curious fact, that two infants, preserved from

hæmorrhagic death by M. Jeunin and P. Dubois, afterwards died with the signs of a very evident *purpura*. In other circumstances the cause of the hæmorrhage has remained undiscovered, but it is probable that we should be very near the truth in attributing it to a condition of scorbutic dissolution of the blood.

All means employed against this hæmorrhage are useless with the exception of the ligature of the cord *en masse*. Styptics internally and externally, alum, rosin, ice, cauterisations with potassa, nitrate of silver, or the red-hot iron, all are of no avail, and in my opinion, valuable time would be lost in the employment of these various substances. The ligature *en masse*, practised by M. P. Dubois, by MM. Jeunin and Bowditch is the only method which has up to the present succeeded.

The base of the bleeding navel must be transfixed with a pin, and beneath this pin a double thread is placed and tightened, so as to prevent the flow of blood. The obliteration of the vessel is thus occasioned and the separation of a portion of the skin attached to the cord. In one case the pin came away on the fourteenth day, and in a child operated on by Dubois it was removed on the seventh day, before the entire division of the parts.

In other children the separation of the umbilical cord is the cause of inflammation of the abdominal walls, and of inflammation of the hypogastric arteries, as Oehm* and Hodgson have pointed out;† of inflammation of the umbilical vein, described by Duplay;‡ and by Scholler.§ This phlebitis, which I have several times remarked, filled the vein with pus which extended into the liver; in these cases symptoms of peritonitis and of erysipelas of the abdominal walls supervene, and the child rapidly dies.

Dr. Bowditch (*American Journal of Medical Sciences;* No. 37, N. S.) relates two examples of this fatal occurence, observed in infants of the same mother, herself a healthy young woman. The first child was a female, and the cord fell off on the third day, without being followed by any unusual appearances until the fourteenth, when oozing of blood commenced. After styptics, compression, and other means had been tried in vain, needles were passed through the skin, to which ligatures were applied, as in hare lip, so as to enclose a circle of integument. This seemed at first quite successful, and the child to be doing well; but on the eighteenth day, bleeding returned; on the nineteenth, it had several bloody stools, which, as well as the umbilical bleeding, continued on the twentieth day, when it died.

After having had two other children, who manifested no tendency to hæmorrhage, the fourth, a male, exhibited this on the *tenth* day, the cord having fallen off on the fifth. Some ecchymosed spots soon after appeared on the body; and the hæmorrhage in spite of all means, amongst which the actual cautery was employed, continued until death on the fourteenth day. In this case there was some jaundice during life, and a very diseased state of the liver found after death.

* *De morbis chirurgicis natorum infantum;* Leipsick, 1772. † *Traité des maladies des artères et des veines;* Paris, 1819; t. i, p. 8. ‡ *Journal l'Expérience*, 1838. § *Gazette Médicale*, 1840.

Dr. Bowditch supplies a short analytical reference to twelve cases which occurred in Boston; and from the imperfect particulars given, we glean that the average age at which the hæmorrhage came on, was seven days and three quarters; the earliest being the third, and the latest the eighteenth; seven days being, too, the longest period that life continued after the hæmorrhage began. In most cases the bleeding was temporarily stopped by treatment, and in many there were bloody dejections. Jaundice was a very common accompaniment (as noticed by Dr. Campbell, *Northern Journal of Med.*, 1844), and the usual termination of life was by prostration. Dr. Radford (in the *Edin. Med. and Surg. Journal*, 1832) makes two divisions of this hæmorrhage: one in which it results from bad tying, or disease of the funis, such as an ossified or varicose state of the vessels; and the other, in which it is due to an incomplete closure of the vessels. The only recourse here, is cutting down and tying the vessels. Some authors have advised internal remedies in umbilical hæmorrhage, on account of the fluidity of the blood observed in these cases; and Dr. Bowditch tried grain doses of sulphate of soda (*Brit. and For. Med. Rev.*, ix, p. 247), but without avail. He refers to the possibility of other cases depending upon the hæmorrhagic tendency, analagous to that seen in adults, and which is sometimes hereditary; and this is, probably, the rational explanation of his own, and the great majority of other recorded cases, and explains the great difficulty of cure. In the *Medical Times and Gazette* (March 25th, 1854), a case is described of infantile icterus, followed by fatal hæmorrhage from the umbilicus, six days after the separation of the remains of the funis; various styptics were applied, and an attempt was made to place a ligature on the bleeding vessels, but the textures were so frail that the ligatures did not succeed. On *post mortem* examination, the umbilical vein was found to be pervious throughout its entire course—the left umbilical artery was also pervious—so that the previous opinion, that the blood was arterial as well as venous, was probably correct.—P.H.B.]

After the separation of the cord, the abdomen presents an infundibuliform depression, surrounded by a more or less decided ridge, formed by the skin, which is still a little reddened and inflamed. A slight purulent oozing soils the linen, and the cicatrix is not perfect and entire until after the tenth or twelfth day. The navel becomes daily more formed. The umbilical vessels contract, drawing the cicatrix inwards, so as to depress it, whilst externally the plumpness of the children appears to deepen it still further. This cicatrix should be bandaged; for when the child cries, the effort might rupture it, protrude the intestine, and give rise to umbilical hernia, as is very frequently observed.

Exfoliation of the Epidermis.

In the first few days following birth, a process of epidermic desquamation constantly takes place from the skin, which has received the name of exfoliation of the epidermis, and which has been very well studied by Chaussier, Capuron, Orfila, and Billard.

Children prematurely born do not present this phenomenon directly after birth; in them the exfoliation of the epidermis is not observed until they have acquired a certain age.

This process, which sometimes commences at the first or second

day of existence, is generally in full activity on the third or fifth day. The epidermis becomes dry, cracks, and loosens; it then falls off in scales of greater or less size. In some cases the exfoliation is scarcely perceptible. It lasts from ten to twelve days, and may be prolonged to thirty, forty days, and even two months. It is slower and more decided in children whom a premature chronic affection has rapidly brought into a state of marasmus.

In proportion as the epidermic layers become detached, a fresh epidermis forms in an imperceptible manner. The skin is red, very irritable, and very readily inflames. Billard has seen a child in which the epidermis of the scrotum was entirely removed, and in which also the urine, irritating the dermis, determined the appearance of a very intense erysipelas. The epidermis is rapidly reproduced in places exposed to the contact of the air, but it appears more slowly in the covered parts, in the axillæ, the neck, in the groin, and in the folds of the skin. Its protecting influence is supplied by lycopodium and other absorbant powders, which dry up the moisture of these parts, and preserve the skin against external irritants.

BOOK II.

ON DISEASES OF THE HEAD AND OF THE NERVOUS SYSTEM.

CHAPTER I.

ON ACEPHALUS.

In some children the head and the upper part of the neck are deficient at the same time as the brain and medulla oblongata. In these cases the pregnancy is rarely simple, it is always a twin one at least, and it is one of the fœtuses which has obstructed the development of the other.

The acephali, moreover, present vices of conformation in the organs of respiration and circulation, which are either wanting or are modified to a greater or less considerable extent. They cannot live independent of the mother, and they die as soon as this communication is interrupted by the ligature of the umbilical cord.

CHAPTER II.

ON ANENCEPHALUS.

Anencephalus consists in the absence of a part of the brain, with or without absence of the cranial cavity.

The most usual form of this vice of conformation is characterized, according to Billard, by the absence of the cranium and of the brain. "The upper part of the cranium is open, the frontal bones are wanting or are mutilated, the parietal bones scarcely leave traces of their existence. A shapeless cerebral mass, covered by red and bleeding membranes, is situate on the base of the cranium, which is usually placed much nearer the shoulders than in the natural state; the considerable projection of the arches of the orbits and of the eyes, the crushed appearance of the face, which then presents some analogy in form with the head of certain unclean animals, to which the vulgar are pleased to compare these children; such is the assemblage of the usual features of anencephalia, in which, in the greater number of cases, the medulla oblongata, and sometimes the cerebellum, and portions of the optic thalami, and the corpora striata only are observed. In others there is integrity of the bones of the cranium, which are only deformed, but internally there is atrophy of the brain, or the absence of the internal lobes, or a simple pouch filled with liquid, having the corpora striata, the optic thalami, and the cerebellum for its base. Nearly all the anencephali, although appearing prematurely, are otherwise plump and well formed. They usually live one or several days, and thus prove that the spinal cord and the medulla oblongata are sufficient to support life during fœtal evolution, and some time, also, after birth.

[In case of acephalus, the skull is either altogether wanting, or is reduced to a merely rudimentary condition. It is liable, also, to various degrees of defect, in acrania being without any vault, and in encephalocele and anencephalus presenting various but less degrees of the same anomaly. Defects of other parts of it are noticed when the cranial or facial bones are fissured; when certain portions of the brain are wanting, or symmetrical parts of it are fused together, as happens in cyclopia, &c. Examples are also met with in which the development of the skull is arrested in a less degree; apertures closed by membranes being found in its bones, or large membranous interspaces between those that form the cranial vault; the fontanelles are large, or unusual ones exist; or certain sutures continue permanently unclosed. The cases of this class mostly owe their origin to a prematurely large size of the brain—to hypertrophy or hydrocephalus.

The number of bones composing the skull is occasionally incomplete; particular

bones are wanting altogether, and sometimes their place is supplied by the enlargement of those in the neighbourhood. An excess of development is observed in those cases when more or less of a second head is formed; and premature closure of the satures and fontanelles constitutes another, but a less, degree of the same general condition.—*Rokitansky's Pathological Anatomy*, vol. iii, p. 205.—P.H.B.]

CHAPTER III.

ENCEPHALOCELE OR HERNIA OF THE BRAIN.

Encephalocele or hernia of the brain, consists of a tumour formed by the passage of a portion of cerebrum or cerebellum through an aperture of the skull. It is a vice of conformation of the same kind as *anencephalia*, only it is less considerable.

We are ignorant of the causes of encephalocele. It is a disease characterized by a small, soft, transparent, rounded tumour, without any change of colour in the skin, narrow at the base and as if pedicellate. It is most commonly observed on the occiput, then at the forehead, the anterior fontanelle, the posterior fontanelle, the lamboidal suture, the internal angle of the eye and the temporal region. Pulsations synchronous with those of the pulse are observed, and an expansive movement simultaneous with that of the respiration. The child experiences no bad symptom if the tumour is not touched; when it is rather strongly compressed, it vomits, sleeps, or becomes convulsed. It continues stationary for a long time, but it ends by growing in a rapid manner, which interferes with the development of the intellectual faculties and predisposes to meningitis or to inflammation of the brain. This tumour has been observed to burst spontaneously in consequence of the gangrene of its walls, whence meningitis and death.

Most of the children labouring under encephalocele usually die in early infancy. Some subjects go beyond and live to twenty-five and thirty-three years, of which Lallemant and Guyenot have seen instances, but these are exceedingly rare exceptions.

Hernia of the brain, in a subject advanced in years, might be mistaken for a wen or a sebaceous cyst of the scalp, and in a child, for a cephalæmatoma or an erectile tumour, as has sometimes happened even to very distinguished surgeons. The diagnosis of encephalocele is, in fact, sometimes very difficult; however the softness, demi-transparence, reducibleness, pulsations synchronous with the pulse, and the expansion which coincides with the respiratory movements, may serve to establish it.

The prognosis of encephalocele is exceedingly unfavourable and depends on the size of the tumour, and on its structure, according

as it is more or less covered by the skin. Death is the most usual termination of this disease.

In the patients who die, the following lesions are observed: a tumour which is generally situated at the occiput either covered by the skin or not; in the latter case it is by the dura-mater, but this is very rare. The skin is red, thin, furnished with hairs at its circumference but not at the summit; beneath the skin is the sub-cutaneous cellular tissue and the epicranial aponeurosis, then the pericranium, and lastly the dura mater lined by the arachnoid.

In this sac a portion of the cerebrum or cerebellum is enclosed, or even the entire cerebellum. The nervous substance is more or less changed and constricted at the situation of the opening of the cranium where it is slightly strangulated. It sometimes contains serum in its interior if the hernial portion belongs to a lateral ventricle. In other cases it is covered by the serum, in variable proportions which may reach nearly seventeen ounces.

Lastly, a bony or fibrous opening, of greater or less size, establishes the communication between the sac of the encephalocele and the skull. It presents no peculiarity.

[Cotunnius was the first, we believe, to draw attention to the fact of their being, in the normal condition of the nervous centres, a fluid present in the cavities of the brain, and beneath the sub-arachnoid covering both of it and of the spinal cord. Magendie elaborated the subject, and termed the fluid cerebro-rachidian. Magendie considered two ounces to be its ordinary amount—Cotunnius four. According to the former, the fluid in the ventricles communicates with that in the cerebro spinal sub-arachnoid space, and accumulates in the greatest quantity when that space affords greatest capacity. A few years ago it was stated by Breschet, after his examination of very many bodies at the Hôpital des Enfants Malades, that in the fœtus, in infants of the full time, and in children of from six months to one year old, a certain though variable amount of fluid is to be found in the anterior or median ventricle, or in the cavity of the septum lucidum. This cavity, well described by the brothers Wenzel and Tiedemann, is found to be larger the younger the child. Morgagni gave the first hint that too great an effusion of the cerebro rachidian fluid might produce an important disease; and Breschet particularly calls attention to the existence of this natural hydrocephalus (as he calls it), as not being directly a disease in itself, but as a circumstance disposing more or less to pathological phenomena, and, therefore, to be regarded as an important point in reasoning upon the cause of intra-cranial effusions in general, and especially upon congenital hydrocephalus.

Dr. Behrend, in an able paper (*Journal für Kinderkrankheiten*, 1849), the design of which—founded upon several cases—is to show that spina bifida, congenital hydrocephalus, and encephalocele arise from one and the same cause; and a highly interesting case that occurred to him, in which the two former affections were present with hyderencephalocele over the brow, seems to support in a satisfactory manner the point which is maintained in the paper in question.

This idea, hinted at by Morgagni, more prominently alluded to by Breschet, and further illustrated by Dr. Behrend himself, that there is a common cause at the base of these affections, or between the former and the latter, and that variety of encephalocele termed *hyderencephalocele* and congenital hydrocephalus.

A writer in the *British and Foreign Medico Chirurgical Review*, states that he is of opinion "that there is sufficient support for assuming that during intra-uterine life, in consequence of an abnormal activity of the vessels of the meninges, a superabundant quantity of the cerebo-rachidian fluid is effused, and that this fluid, normal when in proper quantity, presses unduly against the ossific walls, breaks through them when it finds least resistance, and pushes before it the membranes of the nervous centres, causing them, with the integuments, to protrude in the form of a tumour; the particular affection which is found being determined by the particular seat and extent of this fluid, and by the point at which it meets with least resistance. In Behrend's case, when the fluid was evacuated from the tumour over the spine, the tumour of the forehead gradually diminished, and the distended and protuberant fontanelle fell. It was clear to the observer that there was an intimate connection between the three phenomena. It might be replied, that in spina bifida and those cases of encephalocele in which solution of continuity, not sutural, or deficiency of bony walls, exists, such conditions of the latter, and the permission of protrusion through them, are dependent, primarily, upon an incompleteness or want of progressive perfect performance of the action of *osteosis* than on any local influence exerted upon the cranial of the vertebral walls, in perfect independence of whether the action formative of bone be normal or otherwise. But since, in Behrend's case, none of the bony tissues of the skeleton showed any signs of want of that amount of osteosis which should be expected to exist in relation to the age of the child, except in the particular spots of the cranium and spine where protrusion existed; and since in many other cases of various forms of encephalocele and congenital hydrocephalus, with deficiency of bony continuity, other than sutural, the like fact existed; and not only this but, as shown by Aurivill, Malacarne, Hartell, and others, that save in those localities immediately involved, the bones of the skull have been in many cases thicker than ordinary; we believe that we have sufficient reason for assuming that the protrusion of the external tumour does not primarily depend upon a low development of the power of ossification. On the contrary, we believe the power of forming bony matter to be quite in its normal intensity, and that, if it were even much stronger, the pressure of the fluid would interrupt its action locally, absorption of the earthy matter would ensue, and a retrograde metamorphosis take place in the cartilaginous and ossific formations. We may observe, too, that it has been stated by Behrend, that in cases of *hirni* and *anen-cephalia*, when originally intra-uterine hydrocephalus existed, and the calvarium became not only thinned, separated, or fissured, but quite disappeared, and the brain also, the rest of the skull was almost always unusually thick. Why in one case the pressure of the fluid should be mainly exerted at the top of the cranial vault, in another at the occiput, in a third at the brow, in a fourth at the temporal bones; or why the rachidian fluid should be more effused than the cerebral (or vice versâ), and press in one instance on the lumbar, or in another on the cervical spine (Ollivier's case), we do not pretend to say. Sometimes the distension of the parts which ensues in congenital hydrocephalus is equal; in some instances the direction of the pressure is much stronger towards one side. In many of these latter cases it is evident that such direction of pressure in a particular line is dependent upon the greater amount of effusion on the one side than on the other. Klein found the left side of the encephalon widely distended, presenting the appearance of a mere bladder, whilst the right side had not departed from its natural form. In another case, the left ventricle was so distended as to reach the bulb of the olfactory nerve.

We do not, however, mean to deny that there do occur cases of vices of comformation of the cranial bones, which are independent of a mere local pressure from fluid within, and which may even permit of the existence of some forms of encephalocele.

But we believe, that in the varieties of intra-uterine and congenital disorders we have more especially alluded to, their theory of formation is such as we have cursorily hinted at. Even in cases like the one mentioned by Billard, in which there was complete absence of the petrous portion of the left temporal bone, and, through the space thus formed, a considerable portion of the brain protruded, in a sac formed by the meninges and skin, but void of true scalp, it is probable, as the relater observes, that there existed in the uterus some kind of projection, as a polypoid growth, &c., which, coming into contact with the part of the cranium alluded to, had caused destruction of the scalp, &c.; or else that there was some vice of conformation of the pelvis of the mother, which caused pressure to be exerted on a particular portion of the uterus as it enlarged."—P.H.B.]

Treatment.

It is impossible to reckon on the radical cure of encephalocele. However, we must try, in the limits of a wise prudence, the means which surgery places at the disposal of the practitioner.

If the tumour can be reduced without inconvenience to the child, it should be replaced in the skull and retained there by means of a leaden plate, or one of stiff leather, kept in place by a bandage. If the complete reduction is impossible, we should still try palliative compression, which arrests the increase of the tumour, keeps it of a diminished size, and yet permits the development and the use of the different functions. In this case the compression is practised by means of bandages and concave plates applied on the encephalocele.

Some practitioners have endeavoured to remove the tumour by means of *the ligature* alone, or by ligature followed by excision. All the children treated in this manner have died of meningitis, in consequence of the operation.

Incision has been several times practised, either advisedly to empty the encephalocele of the liquid, or in consequence of an error in diagnosis. Some children have recovered: but why an incision, if it is only attempted to evacuate the fluid? Would it not be better simply to have recourse to a fine puncturation, or to a subcutaneous puncture?

Several practitioners have done this, and Adams amongst others. A puncture may be made in the coats of the tumour with a sewing needle, and this puncture is sufficient to allow the serum to escape. Adams has thus withdrawn half an ounce from one puncture of an encephalocele. The liquid may be reproduced, but at the end of some days it is again let out by the same method, and the operation is repeated seven or eight times if it appears necessary. By combining this method with methodical compression, the rupture of the sac is prevented, and the increase of the cerebral hernia also; the skin becomes stronger, and the children are placed in the most favourable circumstances for their recovery, or at least for the preservation of their existence.

[Several cases are recorded in English practice.

One of Mr. Lyon's cases proves the value of compression in relation to hyder-encephalocele, and several facts are on record which illustrate the treatment by puncture in this disease. They are not very strong in its favour certainly, but they are sufficient to show that when the contents of the tumour are entirely fluid, or much fluid and a small portion of brain, and compression alone is unavailing in reducing them, the idea of puncturation is not entirely to be set aside. Accounts of cases so treated by Lyon, Adams, Earle, and Dendy may be referred to; and to the deductions to be arrived at from reasoning by analogy on the case of spina bifida punctured by Abernethy, one so treated by Sir A. Cooper, and one more lately by Dr. Steevens, of New York, as also from some of the instances in which chronic hydrocephalus has been favourably subjected to a like procedure. In Mr. Lyon's case, when the dura mater and the pia mater lined the interior of the tumour, the latter was first punctured on the right side of the nose, five days after on the left; the third day after the child died. In Mr. Adams's example the tumour underwent puncturation seven times with success, allowing the escape of fluid each time, and finally leaving a solid tumour apparently formed by a protruded portion of the brain. Mr. Earle repeated the operation nine times, the child surviving nearly two months from the first puncturation. Mr. Dendy, during the space of about nine days, punctured thrice with a grooved needle, allowing the escape of about twelve ounces of fluid, the child dying on the tenth day.—P.H.B.]

CHAPTER IV.

ON CEPHALÆMATOMA.

The word cephalæmatoma should be exclusively applied to the effusion of blood formed between the pericranium and the bones of the skull. In consequence of an injudicious extension, it has been employed for certain collections of blood situated above the pericranium, or effused within the cavity of the skull but external to the dura mater.

There are then, 1st, the cephalæmatoma, properly so called, *epicranial cephalæmatoma*; 2nd, pseudo-cephalæmatoma, *supracranial*; and, lastly, 3rd, *intracranial cephalæmatoma*.

1st. On Epicranial Cephalæmatoma.

The true cephalæmatoma, termed epicranial, is a disease but little known—scarcely referred to by Mauriceau, Levret, Bandelocque, &c.; better described by Michaelis and Palletta; and more completely studied in Germany by Naegele, Hœre, Zeller, and in France by MM. Valleix and Paul Dubois. These two last authors, especially, appear to me to have brought to bear on this question all the information necessary to its complete elucidation.

Epicranial cephalæmatoma is, probably, incorrectly regarded as the result of difficult labour, and on the pressure of the head of the fœtus

during delivery; for Naegele and M. P. Dubois have seen it appear after easy deliveries, during which the head of the fœtus had not experienced any remarkable pressure. Michaelis and Palletta considered that cephalæmatoma was the result of a disease of the bone previous to birth, because a bony circle often existed at the base of the tumour, which was looked upon as of old formation. But the bony circle does not always exist, and there is no appreciable alteration of the bone. Naegele supposes a rupture of the vessels of the bone containing blood which forms a small effusion, increased at birth by the establishment of the respiration, and the immense activity given to the circulation. M. P. Dubois attributes the development of cephalæmatoma to a simple separation of the pericranium, occasioned by some violence, a separation which, by leaving pervious the numerous orifices of the vessels of the bone, allows the blood to accumulate beneath the pericranium, forming a collection of blood of greater or less size. M. P. Dubois reasonably brings forward to the support of this ingenious explanation, the results of experiments which consist in elevating a portion of the pericranium, and in injecting a liquid into the middle meningial artery, which is observed to appear, and to escape by the porosities and openings of the external table of the bone.

Anatomical Lesions.

After having incised the scalp and the subjacent aponeurosis, which presents nothing particular, we arrive at the pericranium raised by the hæmorrhage. Ecchymoses exist on the surface and in the cellular tissue situated above it. The pericranium remains transparent, and is simply thickened; its internal surface is shining like a serous membrane, and is, in fact, lined by an exceedingly delicate membrane, discovered by M. Valleix, and in which numerous fibro-plastic elements are found. The surface of the bone is also shining, and covered by a similar membrane to the preceding one, having the same structure and being continuous with it, so that there is in the interior of the cephalæmatoma, according to M. Valleix, an adventitious membrane enveloping the clot of blood on all sides. I thought I had observed the same disposition in a cephalæmatoma presented by M. Morel to the Society of Biology; but an examination made in the interim by M. Ch. Robin, demonstrated to me that if there had been a false membrane adherent to the pericranium, and a precisely similar one adherent to the bone, these two membranes did not become continuous with each other at the circumference of the tumour, as had been stated. M. Robin added, that around the tumour there was only amorphous fibrine, and no fibro-plastic tissue, announcing the existence of a false membrane.

The bone on which the effusion of blood is observed, sometimes

presents more or less apparent asperities, but no caries or necrosis; it is often shining and polished like ivory. Caries and necrosis are only met with when the disease is of long standing, and when suppuration has existed some time.

Lastly, around the effusion at the base of the tumour, a circular elevation often exists, appreciable during life, formed by an osteophyte, that is to say, a bony production of new formation.

This bony ring, circle, or elevation, its designation is of little importance, is never more than one line in thickness and two or three in breadth. It surrounds the cephalæmatoma in its entire circumference beneath the pericranium, and according to M. Valleix, it would be separated from the clot by the thin and delicate membrane which envelops it. It adheres rather strongly to the bone, from which it may be separated. It is hard to cut, and presents all the appearances of a recent osseous production. It scarcely exists around commencing cephalæmatoma, it is very evident at the end of several days when the disease is well characterized.

Once, in a case, different from the one just alluded to, M. Morel exhibited to the Society of Biology the bony swelling of a cephalæmatoma existing only at one side of the tumour and not on the opposite side.

The effused blood varies in weight from seven drachms to eight ounces, it is sometimes black and liquid, sometimes black and coagulated, already presenting a commencement of decolouration; it is sometimes mixed with a small quantity of pus.

Symptoms.

Cephalæmatoma is formed in preference on the parietal bones, more frequently on the right side than the left, sometimes on both sides; it has been observed on the occipital, temporal, and frontal bones; but these instances are more rare. The blood generally remains collected on one bone and does not extend to the neighbouring one. The effusion appears to be limited by the sutures, however it may overstep these and extend from one bone to another. M. Ducrest has observed, a still more curious circumstance, this effusion situated on the parietal bone extend to the bi-parietal suture, pass through it, then beneath the opposite parietal bone, between this bone and the dura mater.

The cephalæmatoma appears in the shape of an indolent well-circumscribed, soft, fluctuating tumour, without any change in the colour of the skin. It often commences before parturition, for it may already exist at the time even when the child is about to be born; but in other cases it is only observed from the first to the fourth day after the birth. It becomes raised, progressively enlarges, and becomes fuller without extending much beyond the size of a nut or

of a hen's egg. At the commencement it is sometimes the seat of evident pulsations which soon disappear. Its size gradually diminishes and finally disappears, without leaving any traces of its existence.

The epicranial cephalæmatoma often presents an osseous circle at the base which separates it from the adjoining parts. The presence of this circle has been the subject of some contradictions. Although its existence is not constant, it is not on that account the less real, and it is in my opinion connected with the age of the cephalæmatoma. This circle is scarcely apparent at the commencement of the disease, but it becomes more so at the end of some days. Thus M. Fortin found on the left parietal bone of a child, even before the delivery was terminated, a cephalæmatoma of the size of a pigeon's egg. Immediately after the birth he ascertained that there was no bony swelling, and two days afterwards he discovered a very evident one.

[Dr. Weber *(Beitrage zur Pathologischen Anatomie der Neugebornen)* appears to participate in the views of Valleix, who considers that "the ecchymosis" is due to circular pressure, which can only be exerted by the neck of the uterus; M. Valleix admitting, however, the exceptional cases, in which the intervention of the osseous walls of the pelvis may act in producing the tumour. That the latter must be very rarely the case, this writer considering, is proved by the fact of cephalæmatoma almost always being observed after easy labours only. On the other hand, from this very circumstance, M. Pauli has sought to establish the influence of the bone of the pelvis, since the tumour only then occurs from the head of the infant being exposed to shocks and *brusque* pressure in rapid labours (Vide Fabre, *Maladies des Enfants*, t. ii, p. 220.) Again, in reference to the opinion of Valleix, it has been asked—How is it, the cause being constant and inevitable, that cephalæmatoma are not more frequently met with? The answer is, that the cases which are most favourable for their production are those in which a very large extent of the parietal surface of the head presents at the neck of the uterus, to the exclusion of other portions of the cranium; and such cases are sufficiently rare. Out of seventy-four examples, Bednàr (*Die Krankheiten der Neugebornen*, &c., p. 175) found the tumour forty times over the right, twenty-two over the left parietal bone, and six over each; four times over the occipital, once both over both parietals and the occipital, and once over the frontal bone. The tumour reached its largest circumference over the parietal, and its smallest over the frontal bone.

It was the opinion of many of the older writers that cephalæmatoma was always connected with primitive disease of the cranial bones. Such opinion had its origin in the following facts: On examining the tumour during life, soon after it appears, a hard and *apparently bony* ridge is felt running round and limiting its base, and on *post mortem* inspection the surface of the bone beneath it is found in many cases to present appearances very different from usual or healthy structure. This ridge was assumed by many (Michaelis, Paletta, Dzondi, &c.) to be the limit or edge of the external table of the bone deficient from vice of conformation, or destroyed by caries. Naegele, in 1819, was the first to dispute the necessary connection of the tumour with lesion of the bone, having seen cases "in which the bones were quite sound and smooth." In later times different views have been held upon the matter. The existence of the *ridge*, in most cases, if not in all, an unusual condition of the upper surface of the bone in some, and a healthy state of it in other instances, are now generally admitted to occur. But what is the nature of this ridge, and what are

the relations of cause and effect between the appearance of the surface of the bone and the sanguinnolent or other extravasation or tumour? Opposing themselves to the views of the earlier observers before alluded to (Michaelis, &c.), Zeller and Pignè regard the ridge as resulting from the pressure of the effused liquid on the bone within its circle; Dubois considers it formed by indurated or diseased periosteum; Carus as the reflected edge of the latter; Krause believes it to be a true osseous ring; Valleix an osseous pad or cushion *(bourrelet)*; whilst Busch, Wokurka, and Bartsch, refer it to "une pure hallucination de toucher!"—Fabre, *Op. Cit.* Finally, M. Dœpp (*Annales de la Chirurg. Franc. et Etrang.* t. x, 1844), from observations made on two hundred and fifty-five children, asserts that in the vast majority of cases the ridge in question has its origin in coagulation of the blood, precisely at that spot where the periosteum, elevated by the effusion, begins to separate itself from the cranial bone. M. Dœpp, however, admits that in certain and rare cases, when the tumour has remained in existence a long time, the superior table of the skull disappears from absorption, or is destroyed by caries, and that in such instances the ridge may indicate the limits between the locality of the deficient bone and that which remains in sound condition. A modification of M. Dœpp's views is now received by many pathologists as the true explanation of the matter. It is admitted that the blood in the tumour quickly coagulates and that the edge of the coagulum imparts to the touch the sensation of a peripheral ring; but that the firm and hard ring, felt as the tumour gets older, is the result of a reparative process, in the course of which a fibrinous exudation is poured out, and heaped up in great abundance at the place before indicated; in some cases also, bony matter is deposited in this fibrinous ridge, so as really to cause it to be an *osseous* circle. (Vide *Lectures on Diseases of Infancy and Childhood, by Dr. West*, edit. 2nd, p. 39. Also, *Medico Chirurgical Transactions*, vol. xxviii.) Admitting that there are cases in which an original abnormal condition of the bone exists, predisposing to the formation of a sanguinnolent tumour, yet it appears to be the fact, that in a very great majority the appearances of osseous disease are truly the *effect* of the extravasation and not its *cause;* an *effect* seen in the destruction of the surface of the bone by pressure in one set of cases, and in another evinced by an attempt at separation being made, "bony plates" being formed at the spot where extravasation existed, causing the surface of the bone to appear as if roughened by ulcerations or caries. Ibid. *British and Foreign Medico Chirurgical Review*, vol. x, p. 9.—P.H.B.]

Progress—termination.

If the blood contained in a cephalæmatoma is not let out by an operation, it may be absorbed and the tumour disappears. When this termination does not take place, an inflammatory process is established, in consequence of which pus becomes formed, which escapes externally, and the child may then recover. But sometimes, as Hœre, Naegele, and Kopp have observed, the bone which supports the tumour becomes diseased, is attacked with necrosis and is perforated. Once, Hœre remarked this perforation of the bone occasioned cerebral hernia.

Prognosis.

Cephalæmatoma is a serious lesion, being very often fatal, but which loses much of its importance if treated in a proper manner, and if as Naegele and Hœre point out, the sac is opened early so as

to evacuate the blood contained therein and to favour the contraction of its walls.

Treatment.

No one has pointed out the therapeutic indications of epicranial cephalæmatoma more precisely than M. P. Dubois. A portion of the following is borrowed from him.

Three methods of treatment are recommended; some would bring on resolution, others suppuration, and, lastly, others the immediate evacuation of the tumour by an incision.

The resolution of cephalæmatoma is sometimes the result of the natural law taken advantage of by the efforts of the organism. It may be assisted by aromatic applications, wine, brandy, either pure or camphorated, sal ammoniac, acetate of lead, &c. If it takes place too slowly, and if, at the end of ten or twelve days, the tumour has not appreciably diminished, we should no longer delay, and the practitioner should have recourse to the operation.

Suppuration effected in the tumour is the method of treatment proposed by P. Moscati, adopted by Gœlis and Palletta. The latter obtained this result by means of the seton. The base of the cephalæmatoma was pierced with a special needle, furnished with a narrow strip of linen. Blood, serosity, and lastly, pus escaped from the tumour; the suppuration was increased by an epispastic ointment, and at the end of fifteen days the cure was complete. This method is simple, and has no other inconvenience than that of sometimes occasioning a very considerable febrile attack.

Gœlis employed caustic potash in order to act superficially on the skin, and to bring about the suppuration of the subjacent parts. It is a difficult remedy to manage in this way, it would, perhaps, be better to have recourse to a limited application of the actual cautery.

The evacuation of the cephalæmatoma by incision should only be employed when a tumour of large extent has scarcely diminished in size during the first ten or twelve days of the disease. Some make a puncture with a lancet, press out the blood from the tumour, and cover it with resolvent applications. Others, amongst whom may be ranked Michaelis, Naegele, and P. Dubois, practise a simple incision extending the whole length and depth of the cephalæmatoma down to the bone, remove the blood, draw the edges of the wound together by means of sticking plaster, and slightly compress the head with a moderately tight bandage, or simply with a linen cap, properly applied and fixed by a large bandage round the chin.

Sometimes the walls of the swelling, instead of becoming united, inflame and suppurate considerably; compression and resolvent applications should then be omitted, and recourse had to emollients, frequent

lotions, and to a simple dressing, changed twice a day. When the bone itself is necrosed, the dressing should be carefully attended to, and the case narrowly watched so as to remove the exfoliated portions when they become detached, then a stimulating ointment, or an ointment powdered over with bark, may be used as a dressing.

[An able paper on this subject has been recently published by Professor Levy, of Copenhagen (*Beobachtungen über des Kephalämatom, &c.*, in the *Journal für Kinderkrankheiten*, p. 161), based on the personal observation of fourteen cases, aided by reference to the experience of other observers. The following are the most important conclusions arrived at by the author: 1stly, that too much stress is not to be laid on the assertion of different writers, that the affection is chiefly met with in primiparæ, since, out of fourteen cases, four were not such; 2ndly, that there is even less reason for believing its frequency of occurrence in boys to much exceed that in girls, as the ratio was only 8:6; 3rdly, that the views of Valleix, as to its usual origin or ordinary mode of formation, are probably incorrect, the disease being rather due to a strong resisting force applied to a particular portion of the head by some part of the bones of the pelvis, varying according to the point of greatest frictional pressure during labour. The assumed cause of Valleix, viz., circular pressure by the neck of the uterus, only produces sub-pericranial ecchymosis, between which and cephalæmatoma the difference, although in one repect scarcely more than in degree, is symptomatically very great. The former is only known to exist by *post mortem* investigation, and is of importance practically to the medical jurist only; 4thly, in respect to diagnosis, there are two points demanding attentive consideration. The first is, that the base of the tumour never approaches nearer to the edges of the bone than from one to one line and a half, and never intrudes upon a suture or a fontanelle. The second, that the base of the well defined swelling is encircled by a hard ring. By attention to the former, and also to the facts that the tumour is non-pulsating, does not move during deep respiration, crying, or coughing, cannot be lessened by pressure, and that the want of bone is an illusory sensation, cephalæmatoma is to be distinguished from hernia cerebri. The presence of the "ring" is constant in *mature* cephalæmatoma. Sometimes it is formed by the first day after birth, in other cases it is not complete in its whole circumference until several days after. It begins to be formed so soon as the periosteum ceases to be separated from the bone, in consequence of the increase of the circumferential swelling of the tumour being arrested. 5thly, Valleix is probably correct in the main as regards the nature of this "bony pad or cushion." It is due to ossification taking place in plasma-exudation, poured out by the periosteum in a state of irritation from the constant distention and pressure it suffers when it is separated from the bone by the extravasated fluid of the tumour. 6thly, as regards treatment it may be stated, that the latter may heal spontaneously, or inflammation or suppuration may ensue, or even caries of the underlying bone. Guided by the first fact, cold evaporating lotions may be applied to hasten the resorption of the extravasated blood. If in six or seven days no very marked diminution of it ensues, the hair is to be shaved from the whole surface of the swelling, and widely around its base; a puncture a quarter of an inch long is to be made by a lancet at a depending point of it, equable pressure to be applied by the fingers to expel as much of the contents as possible, and afterwards general pressure by a compress, the strapping and bandages to be maintained undisturbed for about six days. During this time attention must be directed to the patient and the tumour, so that the effects of the pressure, or the supervention of inflammation, &c., may be known.—P.H.B.]

2. On Supracranial Cephalæmatoma.

This species of cephalæmatoma comes under the history of bloody tumours of the cranium. The blood is situated beneath the aponeurosis and above the pericranium, as Bandelocque, MM. Velpeau and P. Dubois have established. It is composed of coagulated blood infiltrated into the cellular tissue, where it remains several days, and whence it usually disappears by absorption, as in the ecchymosis of adults. Thus situated, it has at least the advantage of never causing the disease or the destruction of the bone. It sometimes also constitutes a true effusion, *en masse*, above the pericranium.

According to P. Dubois, this bloody swelling is constantly the result of a difficult labour, especially when it is prolonged some time after the escape of the liquor amnii; it is also seated on the parts which first present themselves to the outlets of the pelvis; it does not fluctuate, it preserves the impression of the finger, the skin which covers it is of a violet tint; lastly, there is not around its base the osseous swelling which is observed in the cephalæmatoma, properly so called. Sometimes there is in the same subject a combination of this true cephalæmatoma and supercranial cephalæmatoma which adds much to the difficulty of the diagnosis.

When the effusion of blood is not very extensive, absorption causes it to disappear rapidly; if, on the contrary, it is very considerable, the sac may burst, inflame, and cause the death of the child.

The resolution of this species of cephalæmatoma should be assisted by cold and discutient applications, and in case suppuration takes place, it should be opened early with a bistoury.

3. On Intracranial Cephalæmatoma.

This exceptional form of cephalæmatoma has been referred to by Hœre, Baron, MM. Moreau, Padieu, Ducrest. The blood is collected between the bones of the cranium and the dura mater, under the form of a black, semi-coagulated mass, compressing one of the cerebral hemispheres, the cerebellum, or the upper part of the medulla.

Convulsive and paralytic symptoms thence result, due to the compression of the encephalon; we may suspect the existence of this lesion, if it coincides with an epicranial cephalæmatoma, but it is impossible to diagnose it when it exists alone, for its symptoms are those of meningeal apoplexy and of some other cerebral diseases. The uncertainty of diagnosis is not so much to be regretted, for in both cases the hæmorrhage is cured much more readily by the simple efforts of nature than by therapeutical means.

[Instances of this species of cephalæmatoma are sufficiently rare. Dr. Bednàr

states that only once has he seen the veins between the parietal bones and the dura mater gorged with blood and effusion between the latter on the left side; and Dr. Weber, in describing a case of the more common variety, says, "that in this instance also a cephalæmatoma internum was found, easily explainable by the inordinate distention and consequent rupture of the capillaries which connect the dura mater with the inner surface of the skull. I must here observe that I have had but rarely opportunity of seeing this, but where it occurred similar rupture of capillary vessels and effusion existed at other spots, namely above the orbit, between the dura mater and the skull. Although such may be of the same nature as the former, yet the yet the term of cephalæmatoma internum is scarcely applicable to it."—P.H.B.]

CHAPTER V.

AMYELIA.

Absence of the spinal cord is described under the term of amyelia. It is a very uncommon vice of conformation, of which Morgagni and Ollivier have related some examples, and which always coincides with absence of the brain. It appears to be the result of a disease of the fœtus, which in consequence leads to a more or less decided arrest of development. Children who present this deformity die immediately after birth.

In other children the spinal cord exists, but is incomplete or in some manner mutilated. It is divided into two distinct cords, and the medulla oblongata exists in a rudimentary state; these may live a little longer, but they soon die. The same is the case with those who present this longitudinal division of the cord combined with spina bifida, of which Billard has related an instance. Death follows soon after their birth.

[There is only one case on record of *aneuria*, or complete absence of brain, spinal cord, and nerves, in a monstrous fœtus. This is alluded to by Fabre as being recorded by Clarke in the *Philosophical Transactions* for 1793; but whether the case was really as represented may admit of doubt.

From the time of Morgagni, numerous instances have been given of *amyelencephalia*, or absence of the brain and spinal cord. Whether these are cases in which the development of the cerebral nervous matter has ever taken place, or whether it has, and this matter has afterwards become destroyed by increasing secretion of the cerebro-rachidian fluid, is at present undecided, but the latter is most probably the case. The acute remark of Fabre, that as yet no author has described the non-existence of the spinal nervous centre in the embryo, but that all known examples refer to the fœtus when seven, eight, or nine months old, seems to support the view, that the causes determining the absence or destruction of this organ are only developed at a period more or less distant from its first formation, and that, therefore, its absence is never primitive.

Complete absence of the brain, and of particular parts of it, and limited vices of conformation, are not unfrequently met with. M. Lawrence relates a case of a child, born without a brain, which lived four days.—(*Med. Chir. Transact.*, vol. v.)

It is doubtful whether there is a sufficiently trustworthy example recorded of *amyelia*, or absence of the cord, the brain being present. Morgagni, copying Raygei, has given two such cases; but the opinion of one of the highest authorities in this matter, Ollivier, is, that the description of them is not complete or precise enough to warrant their acceptation.

Illustrations of *atelomyelia* or imperfect conformation of the spinal centre are by no means wanting; generally speaking, absence of any portion of the encephalon is accompanied with that of the walls of the cranium, and when both are extreme, they constitute a case of *acephalia*, or headless condition.

In *amyelencephalia*, separation of the parts of the vertebræ, either through the whole length of the spine, or in parts of it, always occurs—but not constantly with protrusion of a membranous sac, as in spina bifida. It has been affirmed that when the brain and spinal cord are both absent, neither cranial cavity nor spinal canal can exist: this assertion is opposed by Fabrê, and is entirely unsupported.—P.H.B.]

CHAPTER VI.

ON HYDRORACHIS OR SPINA BIFIDA.

Hydrorachis, or spina bifida, is a vice of conformation characterized by the existence, at the posterior part of the spine, of a cleft in the bones, whence the coverings of the cord, sometimes a part of the cord itself, and always a greater or less quantity of serum, protrude. Thence one or two tumours containing liquid, situated along the vertebral column, result. Usually there is only one of them, and it is situated in the lumbar region. Bidloo, Valsalva, Hoin, have seen examples which occupied the whole length of the vertebral column; and Dubourg has seen one which descended in the form of a calabash as low as the heels.

Hydrorachis is a congenital disease, the causes of which are entirely unknown. Camper has observed it in twins. It has been referred to external violence received during pregnancy, to a vicious position of the embryo, to the accumulation of the cranial serosity, which prevents the reunion of the vertebræ, &c. It is very frequent, and, according to Chaussier, it has been met with twenty-two times in 22,293 children born or left at the Maternité, that is to say, in the proportion of one case of spina bifida in one thousand births.

Hydrorachis is observed under the form of a tumour of variable size, wide or narrowed at the base, and pedicellate or bilobate. It is rounded, soft, opaque, sometimes transparent, and without any change in the colour of the skin. It is fluctuating, and compression reduces its size very much, by causing the return of the serum it contains. If there are several tumours, fluctuation is readily transmitted from one to the other, and what one loses in size is compensated for by the

increase of the adjoining tumour. Pressure by the hand causes crying, sometimes convulsions, and discovers the cleft spine, the laminæ of which are turned outwards. It also detects more or less decided movements of expansion, which correspond to expiration, and a movement of depression, which coincides with inspiration.

[The different degrees of spina bifida have been grouped into three classes by Fleischmann and others.

1. When the entire vertebra is divided; this is exceedingly rare. Ollivier recites three cases, related by Tulpius, Malacarne, and Zuringer, in which it existed.

2. Absence of a greater or less portion of the lateral arches of the canal; this is the most common variety.

3. When the arches are well developed, but without union posteriorly; here, however, the separation can be but a few lines, resembling a groove rather than an aperture. Ruysch, Aerell, and Isenflamm have each described a case of this kind, the former in the lumbar region, the second in the sacrum, and the latter in the first cervical vertebra.

The absence of the spinous process does not necessarily imply a communication with the interior of the cord. Béclard has found them absent several times as a simple malformation, the bodies preserving their integrity.

Fisher (*London and Edinburgh Philosophical Magazine and Journal of Science*, vol. x, p. 316) found, in two cases, a union of two or more sacral ganglions, the passage of their respective nerves through the sheath in one bundle, and the union of the end of the spinal marrow with the walls of the sac.

Hewett observes (Cases of Spina Bifida, with Remarks, *London Medical Gazette*, vol. xxxiv, 1844), in regard to spina bifida: "The connection which generally exists between the cord or the nerves and the walls of the sac is a point of the utmost importance. Some cases are related, by various authors, in which neither the cord nor the nerves had any connection with the sac; these parts followed their usual course down the spinal canal, but in by far the greater number of cases that have been placed upon record the nerves presented some kind of connection with the sac. Of *twenty* preparations of spina bifida occupying the lumbo-sacral region, which I have examined in various collections, I have found but *one* in which the nerves were not connected with the sac. If the tumour corresponds to the two or three upper lumbar vertebræ only, the cord itself rarely deviates from its course, and the posterior spinal nerves are generally the only branches which have any connection with the sac. But if the tumour occupies partly the lumbar and partly the sacral region, then generally the *cord itself* and its nerves will be found intimately connected with the sac. M. Cruveilhier believes, from his dissections, that this connection is constant."

This is well illustrated by the case of a patient, five months old, who died under Mr. Tatum's care. The cavity of the tumour was intersected by the cord and by the nerves emanating from it. The cord and its nerves, passing out of the spinal canal at the upper part of the opening, run across the cavity of the tumour to its posterior wall, where they are firmly fixed, the nerves being here flattened and spread out upon a fine membrane. From the sac, the anterior branches of the first four sacral nerves return in distinct bundles, forming large loops, to the anterior sacral foramina, through which they pass as usual to form the sacral plexuses. The fluid had evidently been effused between the visceral arachnoid and pia mater; and the walls of the sac were formed by the visceral and parietal arachnoid and by the skin, all of which were much thickened and firmly united to each other.

In cases like this, in which the cord and its nerves pass *through the cavity* of the tumour, it is probable that the fluid was originally effused in the *sub-arachnoid* cellular tissue, after partial adhesions had formed between the cord and its nerves and the two layers of arachnoid covering its posterior surface. But in some cases the cord and its nerves are found spread out upon the posterior wall of the sac, without passing *through* its cavity; and in these most probably the fluid was effused into the sub-arachnoid cellular tissue after *extensive adhesions* had united the cord and its nerves to the two layers of arachnoid covering its posterior surface. Whereas, if the liquid be effused into the cavity of the arachnoid, before any adhesions form between the two layers of the membrane, no nerves will, in Mr. Hewett's opinion, be connected with the sac."—P.H.B.]

Hydrorachis is not always very marked at birth, and only becomes manifest at the end of some days. It is often complicated with hydrocephalus, which may be recognized by the size of the head and by the separation of the fontanelles, and by their protrusion on pressure of the spinal tumour.

Most children attacked by this disease lose flesh and dwindle away; some are paralysed in the lower extremities, in the rectum, and bladder. Some have club feet, others have gangrenous phlyctenæ, and the skin is exceedingly sensitive. As the tumour increases in size, its wells become thinned, fissures form, ulcerations appear, and the opening of the tumour, followed by the gradual or rapid escape of the serum, often causes convulsions followed by death. I say often, in consequence of a rare exception. Maurice, Hoffmann, and Camper have, on the contrary, seen this followed by the collapse of the tumour and its cure.

Hydrorachis is generally a fatal disease. Some children die before or very soon after birth; others live a month, and very few survive to the end of the first year. Bonn has seen one who lived ten years, Varner another who lived to the twentieth year, Camper a third who arrived at the twenty-eighth year, and Moulinié a fourth who prolonged his existence to the thirty-seventh year. Similar facts are excessively rare.

[Druit mentions a case which came under his observation some time ago, of a young woman, aged twenty-seven, in whom the tumour relieves itself when distended by the exudation of a watery fluid through a minute aperture.—P.H.B.]

When the children die, the examination of the vertebral column furnishes the following information.

The division and separation of the vertebral laminæ sometimes exists in the cervical or dorsal region, but more frequently in the lumbar region. There may be two or three separate clefts, as well as the complete division of the spine from above, downwards.

The tumour is composed, 1st, by the thinned skin adherent to the subjacent tissues, reddened, bluish towards the centre, sometimes incompletely formed; 2nd, by a small quantity of indurated subcutaneous

cellular tissue; 3rd, by a fibrous membrane, forming the wall of the spina bifida, smooth internally, and prolonged in the vertebral canal as far as the dura mater, with which it becomes continuous above; 4th, sometimes by the cord spread out in the sac; 5th, by the limpid cephalo-rachidian serosity, which becomes thick and bloody in cases of inflammation; 6th, by the orifice of the cleft vertebræ, which allows us to see the body of these bones intact; 7th, sometimes even by the division of the bodies of the vertebræ; 8th, lastly, by the presence of other deformities, such as anencephalia, encephalocele, hare lip, imperforation of the anus, ectrophia of the bladder, &c.

Treatment.

They formerly abstained from meddling with spina bifida, and it was left to its natural progress. This is often the best thing to be done. But in some cases, when the lesion is simple, and of small extent, we should endeavour to effect its disappearance. With this intention, surgeons employ palliative or curative means.

1. *Compression* by means of a bandage, padded with horsehair, has been employed by Abernethy and Sir A. Cooper, but unsuccessfully, for the tumour reappeared as soon as the pressure was taken off, and which was, moreover, very painful.

2. *Puncture* with a very delicate trocar has been several times very successfully practised; if I were to have recourse to this means I should at least employ puncturation according to the method of M. J. Guerin, so as to avoid inflammatory complications; and after having emptied the tumour, I should exercise moderate compression by means of a well applied bandage.

Some surgeons prefer *acupuncture* to the subcutaneous puncturation. They follow the example of Sir A. Cooper, who, by puncturation with a sewing needle, repeated every four or five days, combined with compression, cured several children. MM. Robert and Rosetti, who have made use of this mode of proceeding in cases in which it appeared most likely to fail, in paralytic children, have succeeded notwithstanding. In the successful cases, the spina bifida and the paralysis have disappeared simultaneously.

[Abernethy punctured the swelling of a spina bifida every fourth day for six weeks. The wounds generally healed very well, but at last the plaster slipped off one of them, it ulcerated, the discharge became purulent, and the child died. Sir A. Cooper performed the operation with a fine needle, and applied pressure. In two of his cases the patients were alive and healthy, the one twenty-eight and the other twenty-nine years after this treatment.

The operation has several times been performed since without success. Dr. Sherwood tried it and failed. Otto punctured the tumour in a child also affected with hydrocephalus, and the tumour disappeared, but the child died three weeks afterwards. Pliny Hayes lost a child in two days after a single puncture. In 1819

Dr. Berndt failed in three cases; the first died twelve days after the operation, the second after three weeks, and the third after three punctures. Benedict Trompei performed the operation on a girl, six years old, with a cataract needle, and she died comatose thirteen days after. Dr. Churchill (*Diseases of Children*, p. 65) tried the same plan three or four years ago, and the tumour was becoming more solid, so as to give some hopes of success, when the child was seized with convulsions and died.

Dr. Steevens's case (*New York Journal of Medicine*, September, 1843) was successfully treated by puncture alone. The tumour was about three and a half inches broad from side to side, and it was punctured three different times, and more than nine ounces of fluid escaped. After the last operation the sac inflamed, and the child became irritable and restless, but these symptoms soon subsided, and a year after nothing remained of the sac but a small bunch of indurated and corrugated integument. The child was eight months old. Professor Rugieri has also successfully employed the combination of puncturation and pressure.

If it is determined to try the effect of puncture, the two following rules, laid down by Mr. Hewett, should be strictly observed.

"1. The tumour should never be punctured along the median line, especially in the sacral region, for it is generally at this point that the cord and its nerves are connected with the sac. The puncture is to be made at one side of the sac, and at its lowest part, so as to diminish the risk of wounding any of the nervous branches.

"2. The instrument ought to be a needle or a small trocar; for if a lancet is used there will be a greater risk of wounding some important part contained in the cavity of the tumour."

Of thirteen males and fifteen females who died from spina bifida in London, in 1849, twelve males and fourteen females died during the first year of existence.—P.H.B.]

3. The use of the seton, recommended by Richter and Desault, finds no longer any partisans.

4. *Excision followed by suture* has been proposed and practised by M. Dubourg on three patients, and the operation has been twice crowned with success. This practitioner opens the pouch and closes the cleft in the spine with the finger, and then removes, by another incision, what is superfluous in the walls, so as to enable them to collapse and unite perfectly together on the back, over the situation of the opening in the spine, by means of a twisted suture.

5. *Circular ligature* may be made use of if the tumour is pedicellate, but such an instance is very rare. M. Beynard has practised the linear ligature by means of two quills, retained on the two sides of the tumour by proper contrivance, and containing in the interior a thread, which is gradually tightened. M. Latil has modified this method of proceeding, and has replaced the quills by wooden rods, pierced with holes at certain distances for the passage of the thread. Under the influence of this lateral constriction, the above-mentioned physicians have seen the tumour mortify and become separated at the end of some days. Adhesion had taken place internally, at the situation of the compression, and the cure was thus obtained at the end of eight or ten days.

6. *Adhesion.* M. Dubois has proposed the combination of puncture, inflammation, and adhesion. He empties the tumour, then applies at the base two convex iron plates, having at their extremities a neck to receive the threads; he compresses the pedicle between the convexities of the plates, so as to produce the adhesion of the internal serous membrane; then two pins are introduced into the holes made in the middle of the plates, so as to transfix the tumour and cause adhesive inflammation. I much prefer the method of Beynard and Latil, which possesses the advantage over the above of reckoning some successful cases in its favour.

7. *Puncture and injection.* It has lately been attempted to treat spina bifida like hydrocele, by means of puncture and injection of iodine. Several children have died from it, but it appears that it has obtained some success. I here relate a successful case which M. Chassaignac reported to the Society of Surgery, and I add thereto the remarks to which it gave rise, and the opinions of several members of this society.

Case. *Hydrorachis, in a child five months old, situated at the lower part of the vertebral column, at the sacrum; the effects of the hydrorachis radically cured by the iodine injection.*

The following is briefly the history of this interesting case:

On January 14th this young child, then two months old, was brought to the St. Antoine Hospital. It had been taken to the Hôpital des Cliniques, to M. P. Dubois, who discovered the nature of the disease, but who was under the necessity of not admitting him into the wards, on account of the small number of nurses engaged for the children born in that hospital.

The child, emaciated and extremely weak, presented over the sacral region a tumour as large as a hen's egg, elongated in the vertical direction, very moveable, slightly pedicellate, having the appearance of a cyst; it was fluctuating and transparent; the skin, which was very thin, had, nevertheless, the appearance of ordinary skin. During the efforts which the child made in crying, the tumour became excessively distended, even to such an extent that a rupture was feared at the most attenuated portion of the skin. When the effort ceased, the tumour appeared less distended; pressure exercised on it caused convulsive movements of the lower limbs.

M. Chassaignac, in consequence of the importance of the disease, which threatened the child's life, and caused impending death, decided on attempting the radical cure by means of the iodine injection.

He first made a puncture with an ordinary trocar. About two spoonfuls of limpid yellow liquid escaped. When the pouch was thus emptied, he discovered the probable point of communication of this sac with the spinal cavity; and applying the thumb over this spot, he injected water and tincture of iodine in equal parts. This liquid was allowed to remain in contact with the internal surface of the sac for one minute, it was then emptied out in as complete a manner as possible, and compression applied by means of strips of adhesive plaster.

The operation was very well borne; there was no immediate convulsive movement. The child was then removed from the hospital, so that the progress of the disease could not be attentively watched. It is said to have had several attacks of convulsions. The symptoms assumed so serious an appearance, that the state of the patient appeared desperate. After the first day, the tumour resumed its primary size.

For fifteen days it thus continued enlarged, it then changed its appearance, and insensibly diminished. It was then discovered that indurated plates could be distinguished on various points of the walls.

At length the tumour disappeared, but slowly; since three weeks only it is entirely collapsed, there only remains a small painless projection, formed by folds of skin, like an old shrivelled apple. In its centre, the spot where the division of the sacrum existed can be distinguished. The general health of the child is considerably improved: he has become more plump. The movements of the limbs are free; in fact, the cure may be considered as quite complete.

Two months since, M. Debout assisted at an operation performed by M. Velpeau in a precisely similar case. The iodine injection did not give rise to any sort of bad symptom. Ten days after the operation, no change had taken place.

M. Lenoir considered the operation practised by M. Chassaignac as quite unique. He thought that it could not be very often applied. To give it really some chance of success, it should only be had recourse to in the case of very minute communication with the spinal canal. For his part, he admitted that he would never make use of iodine injections in the treatment of hydrorachis: in support of this opinion, he alluded to the accidents which sometimes occur when puncture and injection are practised in congenital hydrocele. In spite of the precautions taken to prevent the introduction of the liquid in the peritoneal cavity, the inflammation invades this membrane, and numerous facts prove that death may be the consequence of this operation.

M. Chassaignac appreciated the value of the objections made by M. Lenoir. Up to that time he was of the same opinion, and disposed to deprecate the treatment by puncture and injection, for the suppuration which followed injection appeared to him likely to be a cause of death, in consequence of the passage of pus into the spinal canal. But he has been encouraged in the path he has followed by the known harmlessness of iodine injections, which scarcely bring on inflammation.

M. P. Guersant attached great importance to this case; but that it should possess a complete value, he wished M. Chassaignac to promise to bring the little patient in some months time; for the cure was not, perhaps, permanent. As long as the cleft in the spine exists, so long may relapse be feared. In order to avoid this relapse, M. Guersant recommended the application of a small compressive bandage over the situation of the osseous cleft.

M. Danyau proposed several questions with the intention of discovering if the diagnosis had been sufficiently established. He inquired about the state of the skin over the tumour, if it was completely formed. Then, being struck with the mobility of this tumour, he asked if it was really a *spina bifida*, or only a simple cyst.

M. Chassaignac repeated the description of the tumour—we do

not dwell on it, but simply state that there appeared *little* doubt concerning the nature of the disease.

M. Demarquay thought that success had been due to the absence, in the tumour, of the nervous element, formed, in most cases of hydrorachis, by hernia of the spinal marrow.

M. Larrey related that M. Laborie, in a work published in 1845,* has alluded to hydrorachis, and has pointed out the indications which may allow us to have recourse to surgical treatment; he has also pointed out the mobility of the tumour, its transparency, and the natural structure of the skin as favourable circumstances; and it may be remarked, that in M. Chassaignac's patient, all these characters were met with.

The following, moreover, is the table, as it has been published by M. Laborie:

Hydrorachis may be operated on.	We should abstain from operating.
1st. If the child otherwise appears to be of good constitution, and if the tumour is single.	1st. When the child presents some other vice of conformation, as hydrocephalus, umbilical hernia, paralysis with deformity of the limbs.
2nd. If the tumour is pedicellate.	2nd. When the tumour presents a very extensive base, especially vertically.
3rd. If the skin covering the tumour is completely formed and is not ulcerated, and if a uniform transparency of the tumour is observed through the skin.	3rd. When the skin covering the tumour is incompletely formed and ulcerated.
4th. If pressure exercised on all parts of the tumour only occasions slight, or no pain.	4th. When the tumour appears very sensible to pressure, and especially when this sensibility is decidedly observed on the pressure being applied on the most projecting part of the tumour.
5th. If the movements given to the tumour are painless.	5th. When no movement can be given to the tumour without occasioning pain.
6th. If the tumour fluctuates freely, and if the same degree of fluctuation of the liquid can be everywhere distinguished through the external wall.	6th. When fluctuation is unequally felt, and when in the attempt to discover it at the summit of the tumour, it strikes the finger of the operator in a more direct manner.

To resume—all operations put in force, in case of hydrorachis, present great danger and great difficulties. They generally induce acute inflammation of the sac, and soon afterwards rachidian meningitis. It is the latter disease which causes death.

[A case of spontaneous cure of spina bifida by rupture of the sac is related by Dr. Nance. A girl about thirteen, in whom a tumour, situated at the juncture of the lumbar vertebræ and the sacrum, had increased from the size of the end of the thumb to that of a quart measure. All whom the mother consulted in the child's

* *Annales de la chirurgie française;* Paris, 1845; t. xiv, p. 272.

infancy refused to meddle with it, believing that doing so would hasten a death they regarded inevitable. However, the child, though rather delicate, continued to grow, with the use of all its limbs; the prominence of the tumour being visible, externally, through all her clothing.

After an attack of measles, the skin over the tumour became inflamed, and eventually sloughed, and an immense quantity of straw-coloured fluid came gradually and constantly away, the patient being exceedingly exhausted, as if from hæmorrhage. External and internal stimuli were freely administered; and after the slough had entirely given way, the whole of the matter had been discharged, and a healthy purulent secretion had replaced the gangrenous one, she recovered. The remains of the sac gradually contracted, and there is only left a semi-cartilaginous lump, the size of a walnut, acting as a protective covering where the bone is deficient. Two years have elapsed, and the girl has become a healthy and active young woman.—*American Journal of Medical Science*, vol. xl, p. 552.—P.H.B.]

CHAPTER VII.

FACIAL HEMIPLEGIA.

The facial paralysis of infants is a disease of the seventh pair, caused by the compressive action of the forceps, or by a contusion of the face against a projecting part of the bones of the pelvis.

M.M. Vernois, Smellie, Paul Dubois, Danyau, Landouzy, and Jacquemier have met numerous instances of it.

It is not always easy to discover the facial paralysis of infants, for it causes little deformity. During repose, the symmetry of the face is scarcely altered, and the half-closed eye seems to be the only characteristic of this disease. But the same is not the case at the time of the child's crying. The features are distorted, the commissure of the lips drawn towards the healthy side, and suction is very difficult. However, the paralysis is soon removed, and usually disappears at the end of a period varying from two days to six weeks.

The uvula and the tongue are not affected by the paralysis (Landouzy), and their sensibility is preserved.

This paralysis has as yet only been observed on one side of the face; perhaps it may one day be seen to occupy both sides; this is not impossible, since Smellie has already seen it extend to the upper limbs. M. Danyau has also seen a very curious case in which, with paralysis of the face, he observed paralysis of the arm of the same side. A young primiparous woman, with albuminuria, was seized at the end of gestation with violent attacks of convulsion. After the third attack it was discovered that the os uteri was sufficiently dilatable to allow the introduction of forceps. The child presented itself by the head in the right posterior occipito illiac position, the movement of rotation not being performed. With much difficulty the blades of the

forceps were applied laterally, and by means of rather forcible tractions the child was removed face forwards.

It did not breathe, but it was reanimated by insufflations; paralysis of the left facial nerve was discovered, and paralysis of the left arm besides; the paralysis was nearly complete in the whole limb, motion was only involved, sensation being left intact.

In examining the child, it was discovered that the extremity of the right blade of the forceps had extended beyond the base of the jaw, and had left an impression in the subclavicular triangle, exercising a rather powerful pressure on the course of the brachial plexus, so that a small eschar formed and afterwards became detached.

The child died several days after birth. On the post-mortem examination, there was discovered an effusion of blood near the origin of the brachial plexus. From this point to the external edge of the scaleni, the branches which joined to form the plexus presented a sanguinolent tint which did not disappear on friction.

Beyond the scaleni, at the axilla, the nerves were without colour as in the natural state. The nervous tissue otherwise presented its normal constitution throughout.

The facial nerve also presented an extravasation of blood at its exit from the stylo mastoid foramen.*

In this case the paralysis was evidently caused by the compression of the blades of the forceps, as is elsewhere observed in all the cases of this kind.

[Dr. Weber remarks, that occasionally children live for some time with more or less complete paralysis of one half of the face, or they may entirely recover from it. The cause of it is an extravasation of blood, which his dissections have revealed to be situated between the arachnoid and the dura mater. — *Op. Cit.*, p. 35.

Dr. West observes that the facial hemiplegia is quite independent of any injury of the brain, and is the result of injury to the nerve from application of the midwifery forceps, or as has in one or two cases been observed, from injury received during the passage of the head through the pelvis, without any instruments having been employed. In the only case of the kind which came under his observation, the distortion of the face, though very great at birth — one eye being wide open, and the corresponding side of the face powerless, so that the child was unable to suck — had already greatly diminished within forty-eight hours, and had quite disappeared within a week.

A child having been recently admitted with facial paralysis from exposure to a current of air, occasioned Professor Romberg to remark, that paralysis of the facial nerve does not manifest itself by exactly the same character as the adult; for while, in the latter, the constant play of the features exhibits continuously the want of symmetry in the two sides of the face, this is only observable in the infant when it screams, or its emotions are otherwise excited. In the adult the forehead is more or less wrinkled, but its smooth state in the child prevents its two sides being so remarkably contrasted as they are in the adult. If the child be examined during a state of calm, nothing remarkable is observable in his

* *Union Medicale*, 1851.

countenance; but if we make it cry, the deformity of the lineaments is seen, since the mouth is drawn to the left and upwards, while the right eye is not closed. The parents state, that in sleep this eye is almost entirely closed, which is an important point, signifying that the nervous directing power is not completely abolished, as in complete paralysis the eye remains open during sleep. The collapsed condition of the alæ nasi is not observed as in adults, and it is only when the child sneezes that we can remark it, as upon the palsied side the peculiar motion which this action calls forth is wanting. M. Romberg has sometimes seen such paralysis spontaneously cured, after he has abandoned the use of remedial means for weeks. Still we must not rely on this, since, as a rule, the hope of cure diminishes with the prolonged duration of the case. When general symptoms, calling for treatment, are not present, a blister should be applied to the angle of the jaw, and from one twelfth to one third of a grain of strychnine applied endermically daily, the palsied parts being treated by friction with flannel and "nervine" ointment.—*Journ. fur. Kinderkrank;* xv, p. 125.—P.H.B.]

Facial hemiplegia usually terminates quickly in complete recovery. The child should simply be laid on the non-paralysed side, the light kept from that eye which does not close, and the feeding bottle should be used if the child does not readily take the breast.

When the paralysis is prolonged, the skin should be rubbed with stimulating liniments, small flying blisters should be applied on the face, over the situation of the facial nerve, and galvanism employed.

CHAPTER VIII.

PARALYSIS OF THE DELTOID.

Paralysis of the deltoid is a rather rare accidental disease, which M. Jacquemier has observed, and of which he has related an instance in his work on midwifery.

A strong and well constituted child, born after a rather long and difficult labour, presented to the persons charged to take care of it, a difference between the two upper extremities. M. Jacquemier examined it. The two arms were equally well developed, but the right was as if pendant, and kept itself close to the trunk; the shoulder appeared a little flattened and less rounded. The arm, when raised, fell back inert, contrasting with the opposite limb. The movements of the hand and of the fore arm were freely exercised, but the arm itself could only be moved a little backwards and forwards.

M. Jacquemier at first thought this paralysis of the deltoid a congenital disease, but he soon changed his opinion from the progress of the disorder, which disappeared completely at the end of twenty days. He considered this accident as fortuitous, and attributed it to the compression of the axillary nerve against the humerus, at the spot where it is applied to the deep surface of the deltoid muscle.

CHAPTER IX.

ON PHRENO-GLOTTISM—SPASM OF THE GLOTTIS.

Phreno-glottism is a convulsive and intermittent disease of the glottis and diaphragm, characterized by short attacks of suffocation, returning at very variable intervals.

This disease has been sometimes incorrectly called goitre of infants;* *thymie asthma* or *asthma of Kopp*, from the name of its first observer; *lanyngeal asthma*, *infantile asthma*, *cerebral croup*, *spasm of the glottis*, &c.

Although this last name has been adopted by M. Hérard, as the title of his excellent work, it is objectionable, because it has the

* *Goitre in new-born children.* The goitre of infants is a rather frequent but not generally known disorder. The children who are attacked by it are strong and of good constitution, so that the enlargement of the gland is often regarded as a fold of the skin charged with fat; at other times the neck merely presents a slight enlargement, and in some cases the goitre is not at all visible.

This disease may occasion disturbance of the respiratory functions capable of causing death in some hours, or two or three days after birth.

These children appear to have great difficulty in respiration. The respirations are deep, noisy, and jerking; expiration is also sometimes very difficult, often accompanied with tears. Sometimes the respiration appears to become arrested, and the child is seized with suffocation, when a fresh inspiration, followed by a cry, restores it to existence. These symptoms reappear at variable intervals.

Moreover, the bluish colouration of the skin and of the lips, as well as of the mucous membranes, coldness of the extremities, anguish of the countenance evinced by great agitation of the alæ nasi are constantly present.

Suction is difficult or impossible, the child can neither suck nor drink, its mouth becomes filled with saliva and mucus, and it soon dies asphyxiated.

The goitre of new-born children is the result of hypertrophy of the thyroid body without change of texture; the gland is only more vascular than natural. The hypertrophy sometimes affects the entire gland, which then assumes a half moon form; sometimes the two lobes are united by an isthmus, and then the neck is enlarged; or, lastly, it only exists on one lobe alone. It is especially when the two lobes are hypertrophied that compression of the trachea and of the œsophagus results, which prevents the entrance of air and of liquid.

Goitre is hereditary, a circumstance which has also been assigned to lanyngeal asthma. Moreover, the knowledge of the organic alteration which determines the symptoms just related may throw some light on lanyngeal asthma, spasm of the glottis, thoracic asthma, &c., diseases which produce analogous effects.

The author had recourse to leeches and emetics, and recommends the use of iodine internally and externally when the symptoms are less violent, and when the progress of the disease leads to the hope that medicine may have time to act.—Fred. de Betz. (de Tubingue) *Gazette des Hôpitaux;* Juin 21, 1851.

inconvenience of designating a phenomenon of hooping cough, croup, hysteria, &c., and also that it does not exactly represent the distinct and special disease about to be described.

Causes.

Phreno-glottism is a disease of early childhood—more frequent amongst boys than girls—and attacks weak and rachitic subjects, rather than those who are strong and vigorous. It is sometimes observed amongst children born of delicate, excitable, or nervous mothers; and what is a strong proof of the original disposition of this disease, is its successive appearance amongst all the children of the same family, of which Rullmann, Kopp, Marshall Hall, Toogood, &c., have reported several examples. But this, as M. Hérard says, is not at all extraordinary, when it is considered that the disease is of a convulsive nature, and that it is not rare to see all the children of the same family die of convulsions.

Phreno-glottism is a disease of northern climes, and especially of the winter season. The attacks are brought on by deglutition, particularly by that of liquids, by awaking, emotions, fretting, fright, constipation, teething, stomatitis, angina, pulmonary diseases, &c.

[Spasm of the glottis is not, then, an independent disease, but merely a collection of symptoms consequent on disturbance of the nervous system in general, and of the respiratory nerves in particular. We have seen that its causes are various, but they point to the true explanation of the nature of the affection, an excitation of the true spinal, or excito motory system, which, according to Dr. Marshall Hall, "*originates* in—

I. 1. The *trifacial*, in teething.
2. The *pneumogastric*, in over, or improperly fed infants.
3. The *spinal nerves*, in constipation, intestinal disorder, or catharsis.

These act through the medium of—

II. The *spinal marrow*, and

III. 1. The *inferior* or *recurrent laryngeal*, the constrictor of the larynx.
2. The *intercostals* and *diaphragmatic*, the motors of respiration."—P.H.B.]

Symptoms.

This disease sometimes comes on without any precursory symptoms, and according to M. Hérard, its commencement is always the same; all at once the respiration is suspended, the diaphragm depressed, and the glottis appears to be suddenly closed; for some minutes there is a threatening of suffocation and the countenance betrays great anxiety; the mouth is widely opened as if to respire the air of which it is deprived, the head thrown back, the eyes fixed in their orbits, and the face becomes congested; in a word, there is commencing asphyxia.

After some little time, the spasm of the diaphragm and glottis diminishes, respiration returns, but it is a little jerking, and the first

inspirations are hissing accompanied by a slight sonorous noise, which may be compared to a hiccough of a sharp tone.

The pulse is quickened, and becomes small, imperceptible; the pulsations of the heart are tumultuous and irregular. The chest is immoveable and distended; its muscles are tetanic, and the vesicular murmur ceases to be produced.

The skin is cold and clammy, involuntary evacuations take place, the intelligence remains free, but motion is frequently perverted. Contractions of the extremities of the limbs, especially of the fingers, take place. The thumbs are firmly bent on the palm; the great toe on the sole of the foot. M. Hérard has observed this contraction at the knees and elbows; it has also been seen in the muscles of the neck and eye. Sometimes in place of tonic contraction, clonic epileptiform convulsions are observed; but in this case, phreno-glottism is only the commencement of an attack of eclampsia.

[This spasmodic affection, says West, "differs much in degree: sometimes the thumb is drawn into the palm by the action of its adductor muscles, while the fingers are unaffected; at other times the fingers are closed more or less firmly, and the thumb is shut into the palm; or, coupled with this, the hand itself is forcibly flexed on the wrist. In the slightest degree of affection of the foot, the great toe is drawn a little away from the other toes; in severer degrees of the affection, this abduction of the great toe is very considerable, and the whole foot is forcibly bent upon the ankle, and its sole directed a little inwards. Affection of the hand generally precedes the affection of the foot, and may even exist without it, but I have never seen spasmodic contraction of the feet when the hands were unaffected. At first, this stage is temporary, but it does not come on, and cease simultaneously, with the attacks of crowing inspiration, though, generally, much aggravated during its paroxysms. Sometimes a child in whom the crowing inspiration has been heard, will awake in the morning with the hands and feet firmly flexed, although he may may not have had any attack of difficult breathing during the night. At other times, though but seldom, this state will subside during sleep, while very often it is impossible to assign any reason for its cessation or return. The hands may often be unflexed by bending the fingers, but they will resume their former position on the withdrawal of the force, and such attempts are painful to the child. When the contraction is but slight, children still use their hands, but when considerable, they cannot employ them, and they sometimes cry out as if the contraction of the muscles were attended with pain. Coupled with these carpo-pedal contractions, the back of the hand and the instep are sometimes swollen, tense, and livid, and occasionally there is slight puffiness about the face. This condition is sometimes more general; and on one or two successive years the same child was brought to me, in whom these attacks of crowing inspiration were accompanied with a state of tense anasarca of the whole body."—*Op. cit.*, p. 245.—P.H.B.]

Kopp points out the propulsion of the tongue from the dental arches at the moment of attack, as characteristic of this disease; but this phenomenon is far from constant, as neither MM. Hirsch, Hachmann, nor Hérard have observed it in their cases.

In the interval of the attacks, the voice is not changed, the children

do not cough, and the examination of the throat often discovers a redness, due either to angina tonsillaris or to stomatitis caused by dentition.

The attacks of phreno-glottism last from some seconds to one or two minutes at most. The instances in which the convulsion has lasted longer, have been incorrectly observed, or the attacks have been feeble, interrupted by intervals of rest; for it is impossible to admit that a child can remain without breathing for fifteen minutes and upwards: it has been remarked in a case by Hauff, and in another by Caspari. These attacks come on at variable times: every month, every week, at night, by day, and even every hour. M. Hérard has counted twenty-five of them in one night; and Hachmann fifty in the space of twelve hours.

In the intervals of the attacks, children afflicted with phreno-glottism are lively, and of healthy appearance. Respiration is easy, the pulse good, there is no fever, and the digestive functions are regularly performed.

However, if the attacks are frequent, if the phreno-glottic convulsion is very intense, whether complicated or not with contraction of the fingers, the children are reduced, weakened, peevish, and evidently suffer from the transient asphyxia to which they have been subject.

According to M. Hérard, these children insensibly get weaker and become feverish; the appetite diminishes; diarrhœa comes on; the eyelids and the lips become covered with scabs; the child, in short, is seized with a kind of hectic fever which gently carries it to the grave, if it is not taken off by an attack of convulsion.

Thymic asthma, spasm of the glottis, or, much more correctly, phreno-glottism, presents itself under two forms, slightly differing from each other, as observed by Caspari, Hirsch, and Hachmann. In the first, the phreno-glottism alone exists: this is the *spasmodic* form; in the second, convulsion is observed among children who are hoarse and troubled with cough: this is the *catarrhal* form. This division, however, should not be admitted, as it has yet to be sufficiently established. M. Hérard, on his part, has also made certain divisions, according as there is simple spasm of the larynx, or simple spasm of the diaphragm (in which case it would be no longer spasm of the glottis), or, lastly, according as there is simultaneous spasm of the larynx and diaphragm. These distinctions are no longer admissible, for in reading the observations of M. Hérard it is seen that either double spasm or double convulsion has been observed to be present in all the patients.

Phreno-glottism, or the disposition to phreno-glottic convulsions, lasts from several hours to several days, or even months. Some children have several attacks, and are cured; with others, the attacks are

renewed more or less frequently for some length of time, under the influence of causes we have previously enumerated, and also end by disappearing. In this case the attacks are less frequent and their successive accessions less violent. Severe intercurrent diseases caused them to disappear rapidly, just as is observed in hooping cough. A certain number of children die of these phreno-glottic convulsions, and I believe, with M. Hérard, that the death is to be ascribed to one of the three following causes: 1st, to the asphyxia resulting from a too prolonged closure of the glottis; 2nd, to cerebral lesions, such as congestion of the brain and meningeal hæmorrhage, or to the destruction of the nervous tissue itself; 3rd, and lastly, to exhaustion of the strength. In this latter case, death is slow and results from important changes taking place in the blood, and consecutively in the other functions.

Diagnosis.

The diagnosis of phreno-glottic convulsions is sometimes embarrassing, and it is sometimes rather difficult to distinguish them from the isolated convulsions of the larynx and bronchi, which constitute stridulous lanyngitis and the asthma of Millar. The following is a brief outline of the characteristics of these different convulsive diseases.

In stridulous lanyngitis, or false croup, there is a hoarse, sonorous hissing and dry cough, which comes on by fits, and threatens the child with suffocation.

In the asthma of Millar considerable oppression, little cough, sonorous, hollow respiration, and a threatening of asphyxia.

In phreno-glottism, a momentary absence of respiration, followed by a roaring inspiration, like a hiccough, a threatening of asphyxia, but no cough. Besides, there is also observed, at the end of the attack, contractions of the fingers, which are not observed in false croup and in the acute asthma of Millar.

Several other diseases may also be confounded with phreno-glottism, as, for instance, hooping cough and œdema of the glottis; but hooping cough is characterized by a convulsive cough, and by fits of cough separated by long sonorous and hissing respirations, known under the name of the *hoop (reprise)*. This cough and *hoop* have no resemblance to the suffocation or the hiccough of phreno-glottism. As for œdema of the glottis, there is little chance of mistake, for it does not exist amongst young children, or at least has never yet been met with.

Prognosis.

Phreno-glottism is a very serious convulsive affection. It is a nervous disease which occasions the death of a great number of young children. One third die asphyxiated at the commencement of an attack; some

are carried off by intercurrent or consecutive diseases; one half, at most, are cured.

The prognosis of this affection is so much the more serious in proportion as the children are young and delicate, the attacks more frequent or more prolonged, and the disease more complicated. General convulsions often announce an approaching death.

Pathological Anatomy.

Children who die in consequence of phreno-glottic convulsions do not present sufficient anatomical lesions to explain the disease. The buccal and lanyngeal mucous membrane presents nothing peculiar, the lungs are emphysematous, as they always are in infancy after death from suffocative diseases, and no considerable alteration is found in the brain, spinal cord, phrenic, pneumo-gastric, or recurrent nerves.

If there are anatomical alterations in the children who die, they are purely accidental, and there is not one of them which can be considered as the true cause of death. This anatomical cause remains yet to be discovered.

Kopp and his followers, who consider phreno-glottism as the result of hypertrophy of the thymus gland, and who have consequently imagined *thymic asthma*, are of opinion that this hypertrophy always exists. But this is a mistake; for Hirsch has seen an infant die of this disease without finding the hypertrophy of the thymus, and this was also the case five times out of six in the children which came under the observation of M. Hérard. Besides, in the normal state, Meckel, Burdach, Haller, and M. Hérard have remarked a considerable number of cases of hypertrophy of the thymus without convulsive attacks of the glottis ensuing. It follows, therefore, that as the thymus is not hypertrophied in many cases of phreno-glottism, and also is hypertrophied in many children that are very healthy, hypertrophy of the thymus has no connection with the disease now under consideration.

Other physicians, who have found amongst many children hypertrophy and tuberculization of the glands of the neck, have considered it a cause of phreno-glottismus. But for once that by chance these two things are found united they are met with a hundred times separate, which sufficiently establishes their reciprocal independence.

The incomplete closure of the foramen ovale has been very frequently met with in conjunction with phreno-glottic convulsion, and Kopp has considered this anatomical state as the cause of the attacks. But he is in error, for M. Hérard has examined the hearts of forty children of from two to three years old, who died of any disease except phreno-glottism, and in twenty cases he found a communication between the two auricles.

Several alterations in the brain have been observed and regarded

as the cause of the disease, such as congestion and the effusion of serum in the meninges, or in the ventricles. These changes are evidently only an effect of the disease, resulting from the obstruction to the respiration and circulation which has preceded death. Others have thought that the spinal cord might be the seat of some change—perhaps inflamed; but as they have abstained from furnishing the proofs of this, their opinion is of no weight.

To resume, then, hypertrophy of the thymus, hypertrophy of the glands of the neck, their tubercular degenerescence, the patency of the foramen ovale, cerebral congestion, serous effusion into the meninges, which have been each cited as a cause of phreno-glottic convulsions, do not at all explain the disease. In consequence of an abuse of pathological anatomy, and for want of having made, like M. Hérard, comparative researches, physicians of considerable eminence have taken simple coincidences for causes, or even have deceived themselves by transforming effects into causes.

Treatment.

Phreno-glottism ought to be treated at the moment of the attacks, in the interval of the accessions, and in that of the attacks, in order to prevent their return.

When asphyxia comes on there is indeed little to be done; one must be satisfied with throwing water in the face, exposing the body to the air, causing the respiration of ether or chloroform in order to relax the tetanic muscles. But here the tonic spasm of the glottis, constituting the principal element of the disease, is that which it is necessary to treat and remove. The means for doing so will be presently given. In this case, however, etherization requires the greatest precautions, so as not to add a new danger and a second chance of death to that which already exists.

Perhaps this would also be a fitting opportunity to employ direct narcotism by the endermic method, by means of two small blisters produced by ammonia, applied on the sides of the neck, and each sprinkled with a powder containing .30 and sometimes .15 of a grain of sulphate of morphine.

But if the arrival is too late, and the child during a violent attack has succumbed for some seconds to the effects of asphyxia, the case must not yet be given up. The death may only be apparent; feeble contractions and some distant bruits may yet exist in the cardiac region; artificial respiration must be immediately made use of, and sometimes the efforts are crowned with success, as in cases cited by Marsch and Gunther.

In the interval of the attacks, the treatment is a little different; the children ought to be kept as quiet as possible, free from all

excitement or cause of fretting. They should be left to eat according to their appetite, if there are no febrile complications. The bowels should be kept free and occasionally relieved by slight purgatives. If dentition is difficult and painful, the state of the gums should be carefully examined, and if any tooth appears ready to protude, its exit should be facilitated by incision or excision of the gum.

In order to prevent the return of the convulsive attacks, the air which the children breathe should be changed, and they should be sent to the country. It is the same case here as with hooping cough. Children labouring under phreno-glottism are taken into the country and immediately their convulsive attacks disappear. On returning to town the attacks return, but disappear if the child is again sent back into the country.

Every antispasmodic has been applied against this disease: opium, morphine by the endermic method; belladonna powder, from $\frac{1}{7}$ to $\frac{3}{4}$ of a grain; tincture of belladonna, by the drop; the powder and extract of valerian, foxglove—but this is a dangerous remedy; sulphate of quinine—very difficult to administer except by enemata; cherry laurel water, in gradually increasing doses; assafætida, in enemata; oxide of zinc, $\frac{3}{4}$ of a grain every two hours; hydrocyanate of zinc, from $\frac{1}{3}$ to $\frac{3}{4}$ of a grain every six hours; tincture of Indian hemp, so useful in tetanus, five to six drops every hour, gradually increasing the dose until the spasm gives way.

Some medical men have seriously proposed tracheotomy at the time of the accession, when suffocation is imminent, but they have never practised it successfully as regards their reputation. Others guided by false ideas on the nature of the disease, and believing it to be caused by hypertrophy of the thymus, have recommended the extirpation of this gland; others, equally convinced of the influence of the thymus over phreno-glottism, are more wisely satisfied by bringing about atrophy of this gland; some by weaning, regulated diet, and leeches every four days; others, amongst whom may be reckoned Kopp and his followers, by means of iodine, iodide of potassium, burnt sponge, cod's liver oil, calomel, &c.

APHORISMS.

114. Phreno-glottic convulsions are characterized by short attacks of suffocation and asphyxia, unattended with fever, and terminated by a small, very sharp hiccough.

115. Phreno-glottism very often ceases under the influence of an acute intercurrent disease.

116. Phreno-glottism is cured by change of air, and by the removal of the children to the country.

117. Phreno-glottism followed by general convulsions is a mortal disease.

CHAPTER X.

TETANUS OF INFANTS.

The tetanus of infants has been sometimes described under the names of *trismus infantum* and *eclampsia tetaniformis*. The disease is characterized by clonic spasms of the muscles of the thorax and limbs, accompanied by rigidity of the jaws and trunk.

The tetanus of infants is very rare at Paris; but it is rather common in America and in several localities in Europe, as at St. Petersburgh, Stockholm, Copenhagen, Vienna, and in the south of Germany. It is said to be frequently observed at Algiers under the form of *trismus*, in changeable weather, among European children who are teething. It is also developed under the influence of too tightly laced swaddling clothes, and is a consequence of retention of the meconium and of constipation. James Clarke assures us, that in America the action of the smoke of green wood which fills their chimneyless cabins is a very frequent cause of tetanus amongst negro children. Some say it results from ligature of the cord and from inflammation of the umbilical vein; according to others, it is a consequence of meningeal and spinal hæmorrhage external to the dura mater. But it may be here suggested that the effusion of the blood is rather an effect of the disease instead of being the cause, and that the sanguineous congestion of the tissues is the result of the tetanic convulsion of the muscles of the spine.

In other children no appreciable cause can be assigned as likely to cause this disease. It sometimes appears all at once, like an epidemic, amongst a great number of children at a time, as Underwood and Cejerchsjoeld have several times observed, the former at London, the latter at Stockholm. It is some general unknown peculiarity of the atmosphere which then favours its development.

Under the influence of these different causes, the disease appears on the sixteenth or nineteenth day after birth, according to Evans and Underwood, but sometimes from the first day of life to the end of the first year at the latest. It is either idiopathic or symptomatic, but in both cases the symptoms are very nearly the same.

The children are restless, sleep badly, and wake with a start. They are affrighted at night and cry, a little after the manner of hydrocephalic patients, in uttering a sharp and peculiar shriek. They are disposed to suck, but drop their head on the bosom after having seized the nipple. They have nausea, frequent vomitings, and often slight

diarrhœa. At the end of twenty-four or thirty-six hours, *trismus* shows itself, at first intermittent, then continuous; the jaws and tongue are stiff, suction is impossible, and soon the rigidity invades the muscles of the neck, body, and limbs. The hands become closed, the fingers contracted, and the toes firmly flexed on the soles of the feet. *Opisthotonos*, more or less marked, follows, so as to allow the child to be raised like a log by holding it by one of its extremities.

Opisthotonos sometimes exists alone without the tetanic spasms, and the child, pale and depressed, utters some isolated cries, and remains fixed. Sometimes this rigidity of the body is interrupted by tonic convulsive attacks of greater force, which appear at more or less distant intervals. At each spasm the child stiffens, and is drawn up from the level of the bed; it utters cries, its face reddens and swells, the eyes are injected, the tongue is bruised, and a white foam escapes from the mouth. The least noise, the slightest touch, the sudden appearance of light, the splashing of water, bring on fresh and very painful attacks.

Jaundice nearly always accompanies tetanus in new-born infants; others have observed sclerema, tænia, &c., as complications.

The disease lasts from three to four days, but after twelve or twenty-four hours the convulsions cease, and the child falls into a state of collapse. The body is emaciated, the face altered, bluish, and cold, like the extremities of the feet and hands. Respiration is difficult, interrupted, stertorous, the pulse imperceptible, and the beatings of the heart scarcely to be detected by the ear; the weakness is extreme, and death nearly always terminates the scene. With some children, towards the termination of the disease, a sort of febrile reaction is established about the head, which becomes burning, while the extremities remain cold, but the result is the same and is not retarded.

In a case which Underwood cites as very rare and unique, the tetanus continued beyond the third day, and lasted six weeks before death ensued.

Amongst the children who die, autopsy reveals certain lesions of the nervous centres, which would be of great weight if they were constantly present, and which have been observed by M. Matuszynski in a tolerably large number of subjects. These lesions do not absolutely reveal the cause of the tetanus. They are probably only an effect of it, caused by the hyperæmia which accompanies tetanic rigidity; but such as these researches are they merit a serious consideration.

M. Matuszynski has enumerated the dirty yellow colour of the skin, *numerous ecchymoses* on the trunk and extremities, a large, bluish green areola around the umbilicus, and sometimes vesicles on the neck, thorax, and abdomen. He has observed *effusions of blood*, of variable quantity, in the cerebral pia mater, in the ventricles, and in the choroid plexuses with *considerable injection* of the membranes of the brain. He has

also seen serous infiltration beneath the arachnoid, and serous effusion into the ventricles, accompanied by a diminution of the consistence of the cerebral substance. Sometimes the brain has appeared to him to be indurated at the same time that there was a complete softening of the cerebellum.

This observer has also pointed out the very frequent presence of *an effusion of blood in the vertebral canal*, external to *the investing dura mater*, the effusion being more marked in the cervical region, accompanied with *congestion of the pia mater of the cord*, *congestion of the spinal cord*, and sometimes softening of this organ.

Other observers, as MM. Lévy and Thore, have also several times remarked the presence of effusions of blood external to the dura mater, and injection of all the tissues comprised in the nervous centres. One would, consequently, imagine that compression of the spine and of the brain by hæmorrhage is the most frequent cause of tetanus infantum; but unfortunately this lesion is not constant, and in several instances cited by MM. Matuszynski, Lévy, and Thore, this *post mortem* appearance has not been met with. It is not, then, the anatomical cause of tetanus; and when we reflect that this hæmorrhage, when it exists, is not confined to the nervous centres, but that it is also observed in the other tissues, in the intermuscular spaces and in the skin, under the form of ecchymoses, there is reason for supposing that it is consecutive, or, in other words, that it is the result of tetanus. This is very probable, and the obstructions to the functions of respiration and circulation, occasioned by the tetanic contractions and spasms, would then be a very natural explanation of the effusions of blood observed in the midst of the tissues, and external to the spinal dura mater. This way of considering the question appears to me at present the most justified by observation.

However this may be, the prognosis of tetanus infantum is very unfavourable. It is a fatal disease, which carries off the greater part of the children it attacks. Several cases of cure can, with difficulty, be cited from a vast number of seizures. Cejerchsjoeld states that out of forty-four children labouring under this disease at Stockholm, forty-two died: and the same is the case everywhere. Yet, as several physicians have been more successful in tetanus of the adult, and as O'Shaughnessy, O'Brien, and Miller pretend to have cured this disease by a particular mode of treatment, there is reason to hope that the same result may one day be obtained for the subjects of tetanus infantum—new facts must be waited for. When the children are attacked, death usually supervenes in two or three days—a longer respite is the exception. Once Underwood has seen it delayed to the end of the sixth week.

[Dr. West (*Lectures on Diseases of Infancy and Childhood*, p. 125) mentions that

three cases occurred under his notice in the Dublin Lying-in Hospital, but that no instance has come before him at the Infirmary for Children. He believes that few infantile diseases run so fearfully a rapid course as this; its fatal termination almost always taking place within thirty-six, often within twenty-four hours, from the appearance of the first symptoms. But Dr. Sims, whose experience in this disease is much more considerable, having lately stated that no less than fifty negro children in one plantation have died within the last ten years, says the disease may present different degrees of severity, some cases terminating fatally in a few hours, and others lasting several weeks. Mauthner and Verson mention a peculiar contraction of the mouth to a point, as always to be observed at the onset of the malady, and that the difficulty of swallowing is so great, that the child at every trial made to give it food, rejects it through the nose. Dr. West remarks that the power of sucking is early lost, but for some time the child continues able to swallow. Dr. Sims (*American Journal of Medical Sciences*, 1846-8) is of opinion that the disease is caused by displacements and pressure of the occipital or the parietal bones upon the nervous centre; that if the proper position of the infant be attended to, nature will correct the evil, but it may require the interference of the surgeon to liberate the confined, depressed, or misplaced bone, which may be effected by elevating the depressed occipital with an instrument something like an awl; that the disease depends more upon the improper management of children than on anything else. But these views cannot explain the *epidemic* which occurred in the Lying-in Hospital at Stockholm in 1834, nor the frequency of the affection sixty years ago in that at Dublin. In these cases it would appear to have been produced by a highly vitiated state of the atmosphere; for in adopting means to secure the efficient ventilation of the latter hospital the ratio of mortality of every sixth child within a fortnight after birth and trismus the cause of the death of 19-20ths of their children, fell at once to 1 in 19⅓; and from 1826 to 1833 was only 1 in 58½, and but little more than the ninth part of the mortality depended on trismus.—*Collins' Treatise on Midwifery*, p. 513.

Dr. Weber states that he always found the chief pathological changes in the vertebral column, and not in the umbilical vessels; but Dr. Bednàr writes that the most careful examination of the dead body has not allowed us to discover any visible material foundation of tetanus; even preparations of the separated nerves lead to no desirable end, and we must therefore conclude, that the tetanus of new-born children is a nervous affection, of whose essence we are in ignorance, and which consists neither in anæmia, nor in hyperæmia, nor of inflammation of any part of the nerves system, or still less of any other organ.—*Die Krankheiten der Neugebornen und Saüglinge, &c.*, p. 157.

Dr. Bednàr examined thirty-three children who died from tetanus: three times he found hyperæmia of the spinal membranes, three times blood in the arachnoidal sac, and once serious infiltration of the covering of the cord, &c. The views of Barrier, Ollivier, Billard, and others are, that Trismus is due to spinal apoplexy, or to the effusion of the semi-coagulated fluid in the spinal canal. The testimony of Clarke, Labatt, and Collins renders further information necessary before we fully coincide in the above views. Although trismus is undoubtedly a spinal affection, yet the researches of West offer some serious obstacles to associating the above frequently observed lesions with the symptomatic phenomena in the light of essential or necessary cause.—P.H.B.]

Treatment.

The remedies against tetanus are, prolonged warm baths, narcotic

fomentations over the contracted parts, frictions with camphorated oil, blisters behind the ears, calomel when there is constipation, enemata of assafœtida, tincture of opium, and Hoffman's drops in small and gradually increasing doses, tincture of Indian hemp, as used by O'Shaughnessy, O'Brien, Miller, who, in the adult, have effected the cure of from ten to twelve cases of traumatic tetanus, by doses of sixty to eighty drops every hour. We may commence by giving an infant five drops every hour the first day, then ten drops the next day, and continue it until sleep comes on. This tincture of Indian hemp ought to be prepared with forty-five to sixty grains of the extract to one ounce of alcohol, which makes about seven grains to one drachm of the tincture.

CHAPTER XI.

ON CHOREA.

Chorea, or St. Vitus's dance, is a disease unaccompanied by fever, and characterized by the constant presence of irregular and involuntary movements in the muscles of animal life.

It is very common in the second period of childhood, but is scarcely ever met with amongst children at the breast. Underwood and Billard do not mention it in their works; Baron has never seen it amongst the "Enfants trouvès" during a practice extending over more than thirty years. The only physicians who have observed chorea in infants, are M. Michaud, who states that he has seen a case of it in a child even at the moment of birth, and Constant, who cites an example in a child four months old. The case has been published.*

[Dr. Mauthner's report for 1851 contains two cases of chorea occurring in girls; but it is by no means of common occurrence; Dr. West, at the Infirmary for Children, not meeting with it in above one out of one thousand cases. When it is observed in early life, sudden fright seems to be one of its most frequent exciting causes. At other times, it would appear to be connected with a state of intestinal disorder, or with some irregularity in the progress of the second dentition, while it is occasionally difficult to discover to what the involuntary muscular movements are to be attributed. Purgatives should be administered at the commencement and when the bowels are constipated in the course of the disease; calomel and scammony form a good combination; tonics of the preparations of iron and zinc, or arsenic, as recommended by Romberg, should be given, and the general hygiene of the child attended to, to which end change of air, sea bathing, and a well-regulated but nutritious diet will be found beneficial.

Partial chorea is also occasionally met with, in which some muscles only are affected, and very peculiar cases in which an alternating rotary motion of the

* *Bulletin de Therapeutique*, for the year 1833.

head and the whole body are observed, and these are much more difficult to cure ; quinine, steel, and occasional purgatives are the most promising remedies.

Romberg (*On Diseases of the Nervous System*, vol. ii, p. 55) has only met with two cases in children in whom the muscles of the external and internal respiratory apparatus were attacked. In a child of eight years, the choreic movements of the right half of the body were associated with dyspnœa, whistling inspiration, and palpitation. In the other case, a boy of eight years, at first only the muscles of the extremities, of the face, and the eyes were attacked. The affection subsequently left these parts, and seized upon the muscles of respiration.

Dr. Churchill, while treating of the subject of chorea, observes, "that in other cases the paroxysm consists in hammering the knees with the hands, or of a constant series of bowing. Such cases as these latter, however, have one peculiarity not usual in chorea, *i. e.*, the muscular movements appear independent of the will, neither excited by it, nor under its control ; and it is almost certain that in some of these cases the patient is unconscious ;" this class of cases would appear to come under the head of "*salaam convulsion*" of Sir Charles Clark, and *eclampsia nutans* of Mr. Newnham, who has ably illustrated this peculiar affection in a paper detailing four cases.—*British Record of Obstetric Medicine.* Attention was first drawn to it by Mr. West, of Tunbridge (*Lancet*, 1841); and it was exemplified in his own child, and a paper was lately read upon the subject before the Westminster Medical Society, by Dr. Willshire, who added another case to the only four British examples on record, given by Mr. Newnham.

These cases hardly come under the definition of chorea. The general convulsions which sooner or later accompany the "salaam" movement of the head, sometimes partake of an epileptiform, sometimes of a tetanoid character. Moreover, paralysis and complete idiocy have followed.

Dr. Faber (Smidt's *Jahrb ;* vol. lxvii, p. 213) relates two cases of this curious affection. The *first* occurred in a girl at three, who though pale and weakly, had not suffered from any decided disease until three months before, when she complained of headache and sleepiness, began to squint somewhat, and sometimes to nod her head towards the left side. This nodding action was at first continued only for a few minutes, three times a-day, during which the head was making constant salutation movements. After awhile the attacks increased in frequency, and were fearfully violent. The child was much disposed to sleep, and became, on waking, convulsed in the extremities ; this passing on to complete epilepsy. She was backward in mental development, and had an idiotic expression of countenance. The *second* occurred in a boy at six, who showed great capabilities for instruction up to the commencement of his sixth year, when he fell into the water. He remained in bed several days afterwards in a drowsy state, and was never again so lively and quick. After awhile he was observed to nod his head for two or three minutes, and this several times in the course of the day, the motions being sometimes so rapid that eighty could be counted in a minute. They commenced at first slowly, like real salutations, but gradually increased in quickness, when the child would fall back in a passion. During the time they continued, his face was distorted, and great fatigue was induced. He was aware when the attacks were coming on, and his consciousness continued during their prevalence. He was pale and feeble, and had acquired a peculiar stupid look.

The most careful examination of these two cases did not lead to the determination whether this was a partial chorea or a peculiar form of spasm, or whether it was dependent upon morbid conditions of the brain or spinal marrow. The most careful examination of his two cases did not enable him to decide. No pain

or tenderness about the head or spine were discoverable, and nothing abnormal in the general condition. Various applications and medicinal substances were resorted to, with but very little success—iron seeming the most useful among them.—P.H.B.]

CHAPTER XII.

ON MYOGENIC PARALYSIS, OR ESSENTIAL PARALYSIS.

The title of myogenic paralysis is given to certain cases of partial muscular paralysis, which are incomplete, and independent of any appreciable lesion of the nervous system.

These are cases of paralysis accompanied by an alteration of the elementary tissue of the substance of the muscles, and their partial and circumscribed manifestation upon one, or several, of the limbs, sufficiently indicates the local nature of the disease.

These constitute the cases of paralysis which are sometimes described under the name of *essential paralysis.*

Various authors of treatises on the diseases of infancy have not described this form of paralysis. Underwood accidentally mentions it as a sympathetic result of dentition and gastric irritation; and what he says of paralysis and weakness of the lower limbs, is especially applicable to cases of paralysis symptomatic of affections of the brain, spinal cord, and vertebral column. It is the same with Shaw in his work on curvature of the spine. Lately, very interesting observations have been published by Badham, Kennedy, West, in England; Heine, in Germany; Richard (of Nancy) and J. Guérin, in France. Many of these observations are deficient, and more than one evidently refers to cases of paralysis symptomatic of diseases of the brain and vertebræ. However, if the extreme difficulty of diagnosis in most cases is borne in mind, it will be seen that it is not always possible to avoid error, and we must be more indulgent to those whose works have furnished to science one truth more. Recently, a great step has been made, and a most satisfactory description of the disease has been given us, by MM. Rilliet and Barthez, under the title of *Essential Paralysis of Infants.*

Causes.

Myogenic paralysis is tolerably frequent amongst children. It is more common in infancy and amongst the newly-born than in childhood. According to MM. Rilliet and Barthez, two thirds of the children affected are not more than two years of age. I have only observed this form of paralysis three times, and the eldest of the patients was eighteen

months old at the commencement of the attack. Myogenic paralysis is, then, a disease of infancy. It can, it is said, be congenital, but this is not well proved, and its existence can only be perceived very late.

It attacks boys and girls indiscriminately; the strength or weakness of the constitution and of the health do not appear to have any influence on its development. The different sentiments of authors on this point are far from clearing up the subject; some, as Heine and Kennedy, state, that the paralysed infants are strong, vigorous, and well; some, as West, that they are of feeble constitution; whilst others, as Rilliet and Barthez, that they are lymphatic subjects, afflicted with eczema, opthalmia, &c. Those which I have observed were in perfect health, and very well developed for their age.

Myogenic paralysis manifests itself in the course of teething, but it is not proved that it is a consequence of this physiological process; neither is there any proof that it is a consequence of gastric irritation of which Underwood speaks, the characteristics of which are so badly determined. Sometimes it follows convulsions; but then there is no proof that the brain is not affected.

Kennedy is of opinion that this form of paralysis is often the result of the bad habit which children have of lying down in crooked postures; and he thinks that the pressure of one member by the weight of the body, if the child is lying on one side, may be sufficient to cause the loss of motion in this limb. This is possible, and there is nothing unreasonable in this theory; what has been ascertained on the effects of pressure on the limbs of the adult, makes this ingenious hypothesis of considerable importance.

Another cause, the most important of all, and which plays a principal part in the production of myogenic paralysis, is the rapid cooling of the limbs, from whatever cause it may originate. Thus, amongst aged subjects, the action of cold resulting from a prolonged rest on a stone seat, and, amongst very young children, the cold which chills the nearly uncovered limbs when the arms and legs are improperly wrapped up, is the most frequent cause of partial paralysis confined to several muscles, or to all the muscles of a limb.

Children at the breast, which are prematurely unswaddled, to be muffled up in long clothes; those which are decorated with dresses too short at the neck and shoulders; those which are put to bed without warm night dresses, and which throw the clothes off in their movements; those which are brought up in imperfectly closed rooms, and where they are exposed to the action of the cold during the night, are those most usually attacked with this paralysis, the nature of which, is, according to my opinion, *entirely rheumatic*. I am only surprised at one thing, and that is, that I have not observed this kind of paralysis much more frequently, considering the absurd manner in which children

are clothed, it being frequently observed that their extremities are very cold, and their limbs chilled, in consequence of the inconsiderate fashion in which they are dressed. Such appears to have been the origin of the three cases of myogenic paralysis which fell under my observation.

Symptoms.

Under the influence of the causes which have just been enumerated, the motive power of several muscles of a limb, or of an entire limb, or of one of the sides of the body, or of the two inferior extremities only, is weakened. The paralysis may, then, be either *partial*, *hemiplegic*, or *paraplegic*. It comes on either *gradually*, or *suddenly;* it is either *complete*, or *incomplete; painful*, or *indolent.*

Strabismus, and facial paralysis of infants, which will be described separately, and of which the first is the result of contraction of the muscles of the eye, the other, of injury to the facial nerve, do not come under the above category.

Partial, *hemiplegic*, *paraplegic*, *complete*, or *incomplete* myogenic paralysis are the only examples which will now be described.

It sometimes appears suddenly, without precursory phenomena, especially when a consequence of exposure to cold, and in the morning on the infants awaking, they are found with one or several limbs incapable of motion. It is a primary rheumatic paralysis. In other cases, pains have preceded the appearance of this symptom. Kennedy has published a case illustrative of this; and I have observed a corresponding case of paralysis of the leg; and several physicians have remarked a similar example in paralysis of the sterno mastoid, consequent on torticollis. The limb appears painful, and pressure is followed by considerable suffering; nevertheless, the presence of a precursory rheumatic pain is sufficiently rare in myogenic paralysis of the extremities. In this case the disease would be consecutive.

This paralysis is sometimes preceded by cerebral symptoms, such as eclampsia, or by symptoms of cerebral congestion, characterized by somnolence, strabismus, and fever; but then it is very possible that the disease may be symptomatic of a serious disorder of the nervous centres, and that it is not simply a local muscular affection.

But sometimes this paralysis manifests itself slowly, in a progressive manner, its commencement passes unnoticed, and its real existence is only perceived after it has lasted some time. This particular mode of development is the most usual one.

The paralysis is often only observed in one muscle, the sterno mastoid for example, and the head leans towards the affected side; in the extensors of the fingers, as M. Richard (of Nancy) has observed, and the fingers, without being contracted, cease to be flexed in the hand; in one arm only, which remains immoveable by the side of the

body; in the foot, or in one leg alone; in the arm and leg at the same time, without the face being affected; or, lastly, on the lower extremities, so as to constitute paraplegia.

Myogenic paralysis is very often incomplete, and the muscular movements, although weakened in the various parts just enumerated, are yet possible. The entire, complete, and absolute loss of motion is much more rare, and would cause the apprehension of an appreciable anatomical alteration in the large nerves or in the nervous centres.

From these differences in the seat, and from the complete or incomplete degree of the paralysis, a great variety in the symptoms necessarily results. Amongst infants, and in the first year of life especially, the discovery of the paralysis is difficult and often embarrassing. If the movements are entirely abolished, and if the limbs when raised fall again by their weight, the diagnosis is very clear indeed; but it is not always thus, the movements are merely diminished, and it is difficult to discover how far this muscular weakness extends. Children of so tender an age only possess automatic movements, they do not combine their movements, they are only creatures of instinct, and can in no way assist the physician in his search for the seat and extent of the disease. They do not put out the hand when it is asked for, they cannot extend the foot, and it is then difficult to discover how far caprice or the disease itself participates in the vitiated direction of the movements. It is by a daily and attentive observation that the reality of this muscular weakness is discovered, and either the mothers or the nurses can detect it much more readily than the physician. The healthy limbs by their agility contrast more and more with those incompletely paralysed, and the difference of these movements which becomes more appreciable every day, leads at last to a more correct and reliable diagnosis. The arm remains weak, with little motion, while the other follows all the dictates of the will, and if the child begins to walk, the leg drags and does not assist in supporting it. It staggers, falls, and often refuses to hold itself up, so as to crawl on the ground.

Amongst other children of two or three years old, the symptoms are more evident and more easily recognizable. There is less uncertainty in their appreciations, and the more the subjects are advanced in age, the more easy is the diagnosis of the paralysis.

In children at the breast, the parts attacked by myogenic paralysis are sometimes painful at the commencement, but this is rather rare; they are slightly swollen; the skin, usually pale and white, is sometimes reddish, livid, and roughened. It is, moreover, colder than the skin of the non-paralysed parts, and, according to Heine, who has only made the experiment once, the temperature of the popliteal space fell to sixty-nine degrees Fah. Other observations will be necessary to establish this scientific question.

Progress, Duration, Termination.

Myogenic paralysis sometimes disappears rather rapidly, and in a progressive manner. It lasts several weeks, and vanishes without leaving any traces of its existence. In the greater number of cases it remains a longer time and gets worse. It becomes every day more evident, interferes with the nourishment and growth of the subjects it attacks, so as to lead to the atrophy, deformity of the limbs and degeneration of the tissues of which they are composed. I still frequently see a little girl of four years old who was from the second year of birth subject to this form of paralysis; in the left leg she has now a consecutive club foot, atrophy of the foot, and evident contraction of this limb. This fact has been well pointed out by Heine, West, Richard (of Nancy), J. Guérin, Rilliet, and Barthez. The atrophy is manifest in the length and volume of the limbs, deformities are produced in the joints, in consequence of muscular retractions consecutive to paralysis of the opposing muscles, and on the vertebral column from paralysis of the arm or of the lower limbs; the degeneration extends to the bones, which are shorter and of diminished size; to the arteries, the calibre of which is diminished; and, finally, to the muscles, the fasciculi of which are altered by the addition of newly-formed fibrous and adipose tissue. The *muscular sarcolema* or *perimisium* is thickened and filled with more numerous molecular granulations. The striated fasciculi of the muscles are swollen and infiltrated with molecular granulations, which remain for a variable period, and are sometimes replaced by adipose vesicles. This particular alteration of the muscular tissue only exists after a considerable period, and when the external atrophy is well characterized.

In all these cases, whether at the beginning or at the end of the myogenic paralysis, sensation remains quite perfect.

The other functions are not deranged, there is neither retention nor incontinence of the urine and fæces. General nutrition does not appear to be weakened, the growth of the paralysed parts is alone diminished. Sometimes slight gastric disorders consequent on teething are observed; but these derangements, as has been remarked, are usually only mere coincidences, and do not influence in any remarkable manner the progress of the paralytic affection.

Diagnosis.

The diagnosis of myogenic paralysis is often very difficult. It is sometimes even impossible to give at once an opinion of the nature of the disease, especially if it is of long standing, and the first visit to the patient. It is best not to make a hasty diagnosis, and it is preferable to wait and make daily observation before giving a decided opinion.

If the paralysis comes on rapidly, without precursory phenomena, or in

a gentle manner, without other morbid phenomena, or lastly, if it follows local muscular pains, and remains localized in several muscles or in a limb, the diagnosis is easy, the paralysis is entirely muscular, and independent of the central nervous system. It is a myogenic paralysis, very often of rheumatic origin.

If the paralysis likewise supervenes without any appreciable cause, and shows itself under a paraplegic form without disease of the vertebral column, the paralysis is also independent of the nervous system, and is caused by a special alteration of the muscular system.

In case of hemiplegia, if the muscles of the face do not participate in this alteration, and if there is only paralysis of the thoracic and abdominal member, without preceding acute disorder, the disease has also its primary origin in the muscular system. It is also a myogenic paralysis.

The diagnosis becomes more difficult when the paralysis has followed one or several attacks of eclampsia. Then there is reason to believe in some disorder of the nervous system. Yet, if the eclampsia is unattended with fever, and neither precedes nor follows an acute disease, there is reason to believe that it does not depend upon any organic cause, and that the paralysis which follows is not be referred to it. In this case the paralysis appears to be the result of exhaustion of the muscles, and it may be supposed to be due to this change in the primary fasciculi, which results from exaggerated movements.

But when, on the other hand, paralysis succeeds febrile attacks attended with convulsions, as in meningitis, contraction, as in meningeal hæmorrhage, or general nervous phenomena, as in hydrocephalus, it is evidently the result of more or less severe anatomical lesions of the nervous system. It is a symptomatic paralysis entirely different from that we are now considering.

The same is the case with the paralysis which follows scrofulous disease of the vertebræ, which may be at once dismissed.

Myogenic paralysis, confined to one limb, may give rise to a mistake which it is right to point out. It may be counfounded with disease of the joint to which the limb belongs, whether it be the coxo-femoral articulation or that of the shoulder. Thus, M. Rilliet has reported a very curious case of paralysis of the arm, which in every respect resembled dislocation of the shoulder. There was merely simple relaxation of the ligaments of the joints. West and Kennedy have likewise pointed out the difficulty of diagnosis in cases of disease of the hip joint amongst children who have had no other affection besides the paralysis of the inferior extremity. It is sufficient to be aware of these causes of error in order to avoid them.

I shall lastly allude to rachitis, a common disease amongst young children who are out of health and have been badly nourished, who

are more or less rickety, and who are behindhand in their speech and movements, so much so that a person not warned might fancy them attacked with myogenic paralysis. This is hardly worth mentioning; nevertheless, I have been frequently consulted on this point by parents who were uneasy at seeing their children incapable of walking at an age at which they tried their first steps—they require to know the reason. Still, what a difference between the delay caused by a disorder of nutrition and myogenic paralysis, whether local, paraplegic, or hemiplegic. Thus in rachitis the movements are genererally feeble, one limb does not move more quickly than another, all of them move uniformly, especially when the child is in bed; walking is difficult, but possible with a little assistance; it is a general muscular weakness. In myogenic paralysis, on the contrary, there is energetic action of certain parts and several members, diminution or abolition of movement in the opposite limbs. This contrast renders a mistake impossible.

Prognosis.

Myogenic paralysis of young children is a serious disease. Whatever may be its origin, its result is an alteration of the nutritive functions of a portion of the muscular system, which almost invariably leaves behind it incurable deformities. It is never followed by death. In its incomplete form it is cured more easily than entire and complete paralysis. The same is observed in cases of quickly developed paralytic attacks. Slow and progressive paralysis always last a longer time. The whole of the importance of the prognosis rests on the seat and extent of the paralysis; it is evidently more favourable when it is confined to one of the sterno mastoid muscles or to different muscles of the fore arm than when it attacks the whole of the superior extremity, or, more especially, than when it puts on the hemiplegic or paraplegic form. In these circumstances the unfavourableness of the prognosis results from the greater or less importance of the paralysed parts, and from the incurable deformity which may be the consequence of it.

Treatment.

At the commencement of the attack, the state of the mouth should be inquired into, to discover the state of dentition, and in case any tooth should be on the point of piercing the gum, its protrusion should be hastened by lancing. At a more advanced stage of paralysis, this operation is both useless and senseless, for it would be necessary to practise it on all the patients indiscriminately. What child is there of one or two years old which has not always some tooth ready to protrude? To enumerate this circumstance as the cause of the paralysis is to give to a simple coincidence all the importance of a well founded etiological cause,

and it is a gross error to allow it to serve as a guide in the treatment.

The gum should then only be incised when there is evidence of difficult, slow, and painful dentition.

If the children are constipated, and have some disorder of the digestive functions, it must be promptly relieved. The first means to be employed in myogenic paralysis, is to keep the bowels free by the syrup of chicory or rhubarb, manna in milk, infusion of senna in coffee, or by a small quantity of calomel.

Careful inquiries must then be made into the mode of the children's living, the sleeping apartment, their clothing, their physical education, and if there is not some circumstance which, by favouring the action of cold upon the limbs, has not been the cause of the paralysis. In fact, children are often prematurely put into short clothes, and are thus carried into the open air; often, also, they go to bed without sufficient covering, and the imperfectly closed bed allows the cold to act over the whole of one side of the body. These are sufficient causes to bring on the paralysis which we consider to be rheumatic. Nothing is more evident than this fact when the loss of motion is preceded by pain, as in torticollis, and several other paralyses of the limbs. It is necessary to be careful, therefore, not to clothe young children too lightly, nor to bring them up without long clothes during the first months of life. Whatever may be said of it, swaddling the child is good in one point, if it is only to prevent the young infants from becoming cold; but fashion has banished it, and it would be difficult to defend it gainst the strong feeling of the present time.

At the commencement of the paralysis, if muscular pains exist, they must be treated by baths of bran water, of elder water, vapour baths, and narcotic applications, such as frictions with a liniment composed of equal parts of oil and laudanum, frictions with old balm, and with warm flannels moistened with different substances. Still later, salt water and sulphurous baths ought to be frequently made use of. Dry frictions, either aromatic or stimulant, practised upon the diseased parts, morning and evening, will materially assist the beneficial action of these baths. It is especially advantageous, in this singular form of paralysis, to act upon the capillary circulation, so as to prevent the special alteration of the muscles. To this end, the cutaneous rubifaciants, frictions with croton oil every morning and evening for several days, and frequently repeated after the cure of the vesicular erruption; small flying blisters, &c., may be made use of to arrest the progress of the paralysis. If paraplegia exists, these means should not only be employed on the inferior extremities, but also to the lumbar region, so as to stimulate the nervous influence of the spinal cord.

Electric baths, frictions with metallic brushes charged with electricity, cutaneous galvanism, by means of electro magnetic apparatus, in short sittings of from ten to twelve minutes, according to the strength of the child, may be advantageously used, and should on no account be neglected.

If the paralysis continues, and has produced atrophy of the limb, the electro galvanic puncture must be applied as well as external electricity ; it should be done by means of platinum needles, pushed into the muscles, and charged with a current of electricity of a strength proportionate to the vigour of the children. The needle should be of very small diameter, so as to produce as little pain and flow of blood as possible.

Shampooing gently practised upon the diseased limb, and gymnastic exercises, when they are possible, are proper means to employ, and have furnished good results in the hands of some physicians.

The employment of special medicines, remarkable for their property of exciting the muscles, has, up to the present time, very rarely proved successful. Heine recommends the employment of the tincture of nux vomica, in doses of twelve, twenty, or at most, twenty-four drops; and he believes that he has remarked, at the end of several weeks, an appreciably improvement. He has also had recourse to the sulphate of strychnine in doses of from one-hundreth to one-fiftieth of a grain, and he has seen this medicine almost invariably restore the heat and moisture of the paralysed parts.

Sulphate of strychnine	1½ grain.
Syrup	℥ oj.

One, two, or three teaspoonfuls a day.

The *rhus toxicodendron* has also been used, but nux vomica and strychnine are infinitely preferable to it.

Lastly, when the muscular atrophy has arrived at such an extent as to produce the articular deformities we have mentioned, chiefly cases of club foot, we must wait until the age of six or seven years, without discontinuing local remedies, before having recourse to the special orthopedic operations which are sometimes useful.

[It is not at all necessary, as here advised, to wait until the age of six or seven years for the performance of orthopedic operations ; sections of the tendons for club foot may be performed as early as six weeks, and probably after the age of two or three months ; the earlier it is performed the more effectual is the cure.—P.H.B.]

APHORISMS.

118. The paralysis of one or several muscles of the trunk or limbs, painful from the first, always depends upon a local affection of the muscular system.

119. The paralysis of one or several muscles, following eclampsia, has its seat in the muscles.

120. The partial or general paralysis, which succeeds febrile convulsions, results from a lesion of the nervous centres and cords.

121. Amongst infants, paralysis leads to atrophy of the muscles and contraction of the limbs.

CHAPTER XIII.

ON CONVULSIONS OR ECLAMPSIA OF CHILDREN AT THE BREAST.

The term convulsion is applied generally to all the involuntary disordered movements which are observed in the muscular system of animal life. It seems to designate affections, very different in their nature, but identical in their manifestations, which constitute the convulsive state.

Convulsions are principally observed in the muscles of the face and limbs.

These nervous affections are also described under the names of *infantile eclampsia and puerile epilepsy*, in consequence of the close resemblance between them and the confirmed epilepsy of adults. We shall see further on what is to be thought of this opinion.

Convulsions are especially observed amongst children, but the youngest are those most particularly predisposed to their development. The extremely exquisite sensibility of the brain at an age when the sensations, whatever they may be, are fresh, and consequently dangerous if they are a little excited, explains this. Everything in nature progresses by degrees, and the organs should also become gradually accustomed to external impressions. The veil thrown upon the pupil at the moment of birth, is only dissipated by degrees, and the infant, which is just from its mother's womb, does not at once perceive the light; it could not support the brilliancy of it, and would sink under the painful impression. The light is gradually manifested, and only becomes brilliant when the organs of vision are accustomed to it. It is necessary that the centre of the sensations should become familiarized with the physical impressions, and that the first should also be the most feeble. When the contrary is the case, a violent agitation, a disturbance in the action of the brain, a perversion of the motive functions, the only thing which can exist amongst children at the breast, thence result. Pain is sometimes then the occasional cause of the convulsive state; little matter where it may be seated, even if it should be in the midst of the nervous centres or in quite an opposite part of the body, the consequence and the result are the same.

The nature of the convulsions separates them quite naturally into two very distinct categories. The first includes the convulsions which are only explained by a rapid excitement of the nervous fibre of the brain without an appreciable lesion of this organ. These will be described under the name of *essential sympathetic* convulsions, or *eclampsia*. *Symptomatic* convulsions form the second category; these result from the same nervous excitement produced by a natural alteration of the encephalic organ.

Essential Convulsions or Eclampsia.

Eclampsia does not depend upon natural lesions of the nervous centres; it is developed as a consequence of the most varied causes, and very often in the course of certain morbid states, always the same, which would lead to the belief in the existence of a particular sympathetic relation between the brain and the diseased organ. Now, as this relation is readily admitted in the adult, I do not see why it should be rejected in the child. It declares itself in the first by delirium, which signifies a dissociation of ideas; and in the second, by the perversion of the only and unique cerebral function which exists; that is to say, by the disorder of the functions of the muscles. The convulsive state should then be regarded as the only delirium possible in the young child. The dissociation of ideas can never take place because their association is not accomplished. It is clear that the convulsions which terminate a pneumonia, constitute a phenomena similar to the delirium which accompanies it in the adult.

I have collected ninety-one cases of convulsions in infants at the breast. Of this number fifty-seven had essential convulsions and thirty-four symptomatic convulsions. Amongst those which furnished the essential convulsions, twenty-five were seized in the midst of robust health, and were cured without retaining any traces of it; four died several months afterwards in consequence of other diseases without presenting any material alterations in the brain; seventeen were seized with convulsions in the course of several severe diseases from their commencement, or at the end of pneumonia, in the course of erysipelas, of vaccinal fever, &c. Seven of these died. One alone presented an alteration in the brain. In the centrum ovale of Vieussens, on the right side, was a tubercle surrounded by healthy medullary substance; there remain eleven, of the circumstances of which I am ignorant and the observation of which I could not follow up. This abstract is very curious; it shows in the clearest manner that the convulsive state may be produced—1st, in the midst of the most perfect health; 2nd, during the course of severe diseases, and is synonymous with delirium; 3rd, that no relation exists between certain convulsions and lesions of the nervous centres, since, after our *post mortem* examinations

we find that in eleven children who died a greater or less time after the attack, in ten the encephalic organs did not present any alteration.

Symptomatic convulsions have resulted six times from granular meningitis, twice from simple meningitis, four times from encephalitis with or without tubercles in the brain, once from acute essential hydrocephalus, and once from the presence of a tubercle on the brain without encephalitis.

The following is another statistical account which shows how frequent convulsions are in early infancy, and which furnishes at the same time important information concerning the hereditary transmission of these attacks. I have drawn it up after an attentive observation of the patients, of whom I had the care, in the practice of M. Trousseau. Instead of twenty-four cradles, there were only then sixteen which were occupied. Out of this number of children, seven had been previously attacked with convulsions; with many, the disease was hereditary and inherent to the family. I have only reckoned those as cases of convulsions which were accompanied by loss of consciousness and by considerable muscular agitation. The following account is, perhaps, a little long, but is one of considerable interest:

"1. Eleonora Chopin, one year old, has yet no teeth, and has just been vaccinated. The vaccinal fever was rather violent and threw the child into a very decided state of indisposition; she had on the same day two convulsions, one which lasted twenty minutes, the other ten; they ceased without leaving any traces behind them.

"2. Francis Lecoq, one year old, has two median incisor teeth on the lower jaw, was seized at the time of the protrusion of the superior median incisor tooth with very violent convulsions. He lost all consciousness, the face was swollen and black, the limbs were twisted and convulsed in a thousand ways. He remained ten minutes in this state, and returned to his usual condition.

"3. A girl, twenty months old, previously placed in the same ward, had, at the age of six months, a convulsion developed in the midst of startling circumstances. A patient, whilst in a violent delirium, was put near the bed of the child, which was so terrified at it, that it fell into a fearful convulsion which lasted a quarter of an hour. A second convulsive attack took place at the age of fifteen months, after a two days' constipation, it lasted an hour and a half. It ceased after the administration of an ether draught.

"4. Marie Wadeler, six months old, has not yet any teeth, was seized with well-characterized convulsions, fifteen days after birth. They lasted several days, in succession, and the child was brought to the hospital when three weeks old. After a constipation of twenty-four hours, fresh attacks of convulsions came on which lasted a day and a night, with very slight remissions and a complete loss of consciousness.

"The mother of this child has already had four children who died after convulsions. The first died at two months old after a convulsion of seven hours' duration, returned to a state of health and which lasted while it was at the breast. The second, eleven months old, had been a long time ill; it coughed much, had frequent diarrhœa; it died from marasmus, in the midst of convulsions, after having been several times attacked by them in the course of its illness. The third died at the age of twenty-three months, after a long-continued suppuration from the ear; it had become much emaciated. A convulsion, the first that it had, terminated its existence. The fourth lived to the third year without having convulsions; but it complained of headache, vomited, and afterwards had an attack of convulsions followed by coma. It died on the ninth day.

"The mother had been very hysterical from the fifteenth to the twentieth year.

"5. Jeanne Bois had very frequent convulsions up to the age of seven, and after the last attack an irregularity of the mouth was the result. She has had ten brothers and sisters, of whom six died in the midst of convulsions. The four who lived have had the same nervous attacks up to the age of seven or eight. One of them suffers from a contraction of the sterno mastoid muscle.

"This woman has had ten children in fifteen years. All have been suckled by her with the exception of the first; this one had many convulsions up to the age of three years. It died after an acute disease of the bowels.

"The second, eight months old, was about to cut the two first incisor teeth, when, one morning about five o'clock, it had convulsions, which lasted until the evening, when it died.

"The third died at eight months old, having at that time twelve teeth, without presenting any nervous phenomena during this rapid dental evolution. Just as the twelfth was protruding, the child appeared indisposed; it first had diarrhœa, afterwards constipation; it was then seized with an attack of convulsions, in which it died.

"The fourth was sixteen months old: it had already had convulsions; they reappeared every day during a thoracic disease which lasted two months: they increased in intensity. The last was very strong—lasted ten minutes, and terminated in death.

"The fifth is living. In his case convulsions appeared at nine months old, and lasted until the seventh year. He is now in his ninth year.

"The sixth is seven years old: has only had four convulsions in its life. After the last, which took place eighteen months since, there remained for several weeks a contraction of the arm, which gradually disappeared.

"The seventh has had three convulsions. It died at eight months

old, at the end of an enteritis, also terminating by convulsive phenomena.

"The eighth, three years old, has also been much subject to convulsions. The first attack left behind it a drooping and convulsive motion of the eyelid.

"The ninth died at the age of nine months, without a nervous attack and without convulsions.

"The tenth, Marie Bailly, six months old, and at present under the care of the nurses, has already had a convulsion at the third month of birth: it lasted ten minutes.

"All these children were visited by the same medical man, who gave them an anti-spasmodic draught. While awaiting his arrival, the mother took the precaution of putting a little salt in the mouth.

"6. Leon Spinget experienced a violent convulsion at the age of four months. He has had six to-day. This attack took place immediately after the child had been suckled by his nurse, who had just experienced a violent fit of anger.

"7. Jacques David, twenty months old, has very often had convulsions in the midst of perfect health. At sixteen months he had small-pox, which was preceded by similar nervous attacks. At the present time he is labouring under a slight attack of laryngitis, and he has already had two convulsive attacks, with loss of consciousness, swelling and blueness of the face, turgescence of the veins of the neck, irregular movements of the muscles of the limbs; phenomena followed by a period of remission and sleep. The mother of this child was subject to convulsions up to the age of eight years."

No remarks will be here made upon the facts just reported. They will be much better placed in the course of the description, and will be of more profit to the reader.

Causes.

Eclampsia is developed in the youngest children, and in those who present a decided predominance of the nervous system. It is observed amongst those of precocious minds, and who manifest to a certain degree this premature development by the cast and expression of their countenance. The most fugitive sensations leave their impression there. These children early exhibit their caprices and their wishes; they tyrannize over those who are about them; an unexpected noise greatly distresses them; their sleep is broken, and is often interrupted by slight muscular movements, and sometimes by cries of terror, which wakes them with a start and leaves them bewildered at those who approach them.

Eclampsia is decidedly hereditary. Besides the facts reported by Baumes and by several others in support of this opinion, we have cited the example of a family composed of ten persons, all of whom

had convulsions in their infancy. In course of time one of them married, and she had ten children, all of which, with the exception of one, had convulsions. Six of them are dead.

Let me be here allowed to report the case of a woman, subject to a convulsive attack up to the age of eighteen years, and that of another woman, hysterical since puberty, whose children have several times suffered from convulsions. The moral emotions experienced during pregnancy appear also to have their influence on the development of this disease. MM. Guersant and Blache, who admit this circumstance only with reserve, relate the case of a woman of very irascible temper, especially when pregnant, who witnessed the death of three of her children shortly after birth, in the midst of well-characterized convulsions.

The force of habit is also cited as the predisposing cause to repeated convulsions. It is, however, possible that the nervous phenomena which it is supposed ought to be referred to this influence, may be the result of the same general disposition which has provoked the first attacks. The second convulsion is, like the first, the consequence of an encephalic excitement, which has only an effect in consequence of a special constitution of the child.

Eclampsia is sometimes observed amongst plethoric children, as well as in those who are in the most anæmic condition. Both these causes concur to the same result; however opposite they appear, says M. Barrier, they produce the same effects: "The convulsive state comes on in a new-born infant which is in a plethoric condition, in which the umbilical cord has been tied too soon, as well as in that which a copious hæmorrhage has rendered anæmic."

All powerful sensations; fright, in consequence of a great noise; the dazzling from a very vivid light soon after birth; the jealousy excited by the attentions bestowed on another infant; fretfulness and anger; the tactile impressions caused by tickling; the pain produced by too tight dresses, or in which a pin is about to pierce the skin; the pain resulting from dentition, or some organic lesion; all these sensations are likely to produce eclampsia. Heat, and the vitiation of the atmosphere, often determine the same results. "We have frequently seen," observe MM. Guersant and Blache, "young children attacked with convulsions from having remained in a strongly-heated room, in a theatre, or in a church where a great number of people were assembled."

Alterations in the milk of the nurses sometimes produce attacks of convulsions in infants. It comes on when the woman has had the secretion of milk momentarily disordered by a violent fit of anger, and when the suckling has taken place during this condition. The milk is modified in its proportions; it becomes thin, serous, and contains little cream. It is, doubtless, in consequence of a similar alteration,

and under its influence, that the child, of which M. Guersant speaks, fell into a convulsion each time that its mother, a readily excited woman, gave it the breast after receiving the embraces of her husband. Under this head may be cited the example of particular idiosyncrasies, in which the milk of women who suckled their own children without inconvenience has been observed to cause convulsions in others. This fact is reported by Sœmmerring, and repeated by MM. Andral, Guersant, Blache, and Barrier, who relate them without comments; yet it is so extraordinary and so contrary to what is daily observed, that one can scarcely believe but that some undiscovered circumstance might not have been the cause of a mistake. Every day, in fact, hundreds of people give up their children to hired nurses without anything similar happening.

The convulsive attack is very often observed in consequence of disease and disorder of the digestive apparatus. The retention of the meconium; the presence in the intestines of indigestible substances which cannot be assimilated, and which obliterate its calibre; the presence of fæcal matters, &c., are so many causes which favour its production. On the other hand, and by singular contrast, it is developed sometimes in the course of a violent intestinal flux, whether natural or brought on by the administration of a purgative. M. Trousseau has several times made remarks to me of this rather remarkable circumstance, on account of its rarity, and of the generally received idea which accords to constipation the most prominent part in the production of these attacks. It is said that they are also brought on by the presence of worms in the intestinal tube. This cause, the influence of which is so generally believed, even by well informed people, hardly merits this great attention. It is very probable that those of our confraternity who have laid so great a stress on various symptoms consequent upon the presence of worms, have observed them in a very different latitude to that of Paris. In this city, intestinal worms are very rare, and are chiefly remarked in typhoid fever. There are few medical men, in my opinion, who have had the opportunity of confirming such a certain influence exercised by these entozoa on the health of children, and especially who can lay to their charge all the disorders which have been formerly attributed to them.

Convulsions are also observed at the commencement and in the course of certain inflammatory diseases. Thus, M. Barrier states that he has thrice observed them at the commencement of an attack of pneumonia, without any lesion being present in the cerebro-spinal axis. They manifest themselves sometimes at the commencement of small-pox and measles. These attacks form sometimes a favourable omen, and, according to Sydenham, may predict the favourable termination of these diseases. They also appear in the course of diseases of

the respiratory apparatus, during hooping cough, pneumonia, &c. I have seen a child who suffered from them for eighteen days during an attack of hooping cough. Those which come on at the termination of acute diseases are always of serious omen, and almost invariably indicate an approaching death.

[West is of opinion that the grand reason of the frequency of convulsions is no doubt to be found in the *predominance of the spinal over the cerebral system in early life.* In the adult the controlling power of the brain checks the display of these reflex movements, which become at once evident if disease heighten the excitability of the spinal cord, or cut off the influence of the brain from the paralysed limb, or even if sleep suspend that influence for a season. When the child is born the brain is but imperfectly developed, its functions are most humble, and convulsions are then so frequent that they are computed to occasion seventy-four per cent. of all deaths which take place during the first year of existence from diseases of the nervous system. In the next two years the brain more than doubles its weight, and deaths from convulsions sink to nearly one third of their former frequency. In proportion as the brain increases in size, and its structure acquires perfection, and its higher functions becomes displayed, convulsions grow less and less frequent, until from the tenth to the fifteenth year they cause less than three per cent. and above fifteen less than one per cent. of the deaths from diseases of the nervous system.—*West on Diseases of Infancy and Childhood.*

It will appear from the Registrar General's Report for 1849, that of 1,135 males who died of convulsions in London during that year, 1,123 died under five years; and of 928 females, 890 died under five years. The following abstract gives the number of those who died in 1845-49, and the quarter of the year in which they died:

	1845.	1846.	1847.	1848.	1849.	Total in the quarter.
Quarter ending March . . .	696	511	619	634	561	3021
,, June . . .	641	514	526	499	516	2696
,, September .	608	513	521	466	512	2620
,, December .	450	548	592	477	473	2540
Total in different years . .	2395	2086	2258	2076	2062	

The influence of the *relative* state of the brain and spinal cord in permitting spasmodic movements has been pointed out by Mr. F. Barlow (*Med. Gazette*, p. 627, 1848), who has shown how clearly Hunter foreshadowed the more definite reasons which, from the investigations of Marshall Hall and others, we are able to give for it at the present day. "Women, children, and sick men," says the illustrious Hunter, "are subject to fits for the reason just mentioned (the muscles being less at the command of the will). Perhaps, also, diseases of the uterus, for the same reason, are the cause of spasmodic complaints, as being very little at the command of the will, but of other circumstances; and from this disposition it draws in other parts by consent, and so brings on general spasm." Proneness to convulsion, then, appears to be, *cæteris paribus*, inversely to the energy of the will.

West agrees with Bouchut that in a large proportion of cases convulsions in the infant answer to delirium in the adult. "In early life, the superintendence of the motor power is the chief function of the brain, which has not yet attained to its highest office as the organ of the intellect. Hence the convulsions which you may observe to come on in infancy in the course of some acute diseases, such as inflammation of the lungs, do not import that any new malady has invaded the brain, but simply that the disease is so serious as to disturb the due performance of all the functions

of the organism, and of those of the brain in common with the rest. Convulsions at other times take place in infancy, not as the result of any abiding disease of the brain, but simply in consequence of those anatomical peculiarities which allow of a much more sudden and more considerable congestion of the cerebral vessels than can occur in the adult. Of this kind are frequently the convulsions that come on during a paroxysm of hooping cough, which are induced by the impediment to the return of the blood from the head, and which cease so soon as that impediment is removed by the child taking a deep inspiration. But these considerations are, it must be owned, by no means adequate to explain the very great frequency of convulsions in children, though they account for much that otherwise would be inexplicable."—P.H.B.]

Symptoms.

Essential and sympathetic convulsions are characterized by more or less violent irregular involuntary movements in the muscles of animal life. Consciousness is not completely lost; every exterior manifestation is impossible, but the exercise of thought remains sometimes intact, as established by the revelations of children of a sufficiently advanced age to give an account of their sensations. The slight attacks which are occasionally observed in children, and which are characterized by twitchings in the limbs, with wandering of the eyes, which turn up under the upper eyelid, are not reckoned as convulsive attacks; these are called *internal convulsions*, by persons unacquainted with medicine.

Essential convulsive movements are intermittent, and appear under the form of attacks, the number and duration of which are very variable. The commencement of the fits is often quick and unexpected. It is announced amongst children, already rational, by certain premonitory symptoms, due to an exaggeration of the habitual nervous sensibility. There are no premonitory symptoms in the child at the breast; at least there are none of these symptoms which are appreciable to the physician.

These attacks come on suddenly, and without any influence to account for their appearance; in others, are observed to be consequent upon moral influences experienced by the nurse, from some of these circumstances already mentioned, in the course of dental evolution, or at the commencement of a very serious acute disease.

The child appears surprised by a strange impression, its look becomes fixed, and appears as if lightened up; its body lengthens, the limbs stretch and stiffen; the head is thrown back; the face is swollen and is covered by a sudden blush; then, after an instant of uncertainty and anguish, the head is observed to turn to the left or right, the jaws tighten, and the limbs, strongly stretched out, are suddenly agitated by alternate efforts of flexion and extension, and the respiration appears as if suspended. Soon an internal effort seems to be produced, the face becomes blue, the superficial veins of the neck prominent and well-defined beneath the skin, and then the convulsive movements appear.

The look is exceedingly wild, the eyes hidden, very moveable, each is agitated independently of the other, one taking a direction which the other does not follow, turns upon itself, while the other is immoveable, and then they are hid under the upper eyelid, so that only a white surface is perceived, that of the sclerotic, the appearance of which is so peculiar. The features are deformed, and sometimes become frightful in consequence of the rapid contractions of the muscles of the face. The lips are drawn in all directions, their rapid contraction communicating to the face the alternating and varied expressions of pleasure or of anger. The fingers are in their turn bent and extended without affording any important diagnostic point by their position. The hands are turned inwards, the arms are convulsed, flexion predominates, and takes place by jerks, which carry the hand upon the chest, and cease all at once, so as to allow this part to return to its original position. The toes are separated and bent towards the sole of the foot, the knees are drawn up, and then the limb is again lengthened. Respiration is irregular, the movements of dilatation of the thorax are rapid, short, incomplete, sometimes intermittent, and followed by a deep inspiration, which is succeeded by a moment of rest, lasting several seconds, and during which the opposing action of the muscles of inspiration and expiration is observed, the power of which is mutually annihilated and destroyed. After this moment of repose, a fresh series of respiratory movements comes on, accompanied by the same phenomena. It is difficult to feel the pulse during the muscular spasm of the limbs, but in the remission of the convulsion it is always found to be very much accelerated, amounting to 110 and 120 pulsations a minute. The muscles of the bladder and rectum are also equally affected. They are no longer under the dominion of the will, and the contents of these organs are voided without the child being able to retain them.

The disorder of the muscular function is often accompanied by a perversion of the senses and intellect.

The former are usually disordered, the children take no notice of the things which surround them; noise, flashes of light, do not appear to produce the slightest impression upon them. The cutaneous sensibility is only partly destroyed. The manifestation of pain is obscure, but it appears that a movement and a slight contraction of the face still point out the perception of the pain produced by a pinch or prick of the skin. In strong convulsive attacks, the most painful impressions are not followed by an appreciable effect; nothing reveals the preservation of the sensorial and organic functions, which appear to be entirely abolished.

The convulsive phenomena are combined in a thousand ways, and may offer the most varied aspects, which daily observation proves. All

of these are rarely observed at once in the same child. They are often followed by a permanent contraction of some of the affected parts, which may be the cause of a future deformity. We have cited an example in proof of this; they are most frequently observed in the limbs, especially in the superior extremities. They are often more decided on one side than on another; and this difference is especially remarked in symptomatic convulsions, of which we shall speak further on.

The duration of the convulsive attack varies in inverse proportion to its intensity. The most feeble last the longest; the most violent, on the contrary, disappear the quickest: it would be impossible for a child to resist the disorder it causes in its organism. Some cease in a few minutes; others after several hours, or even after several days. In the latter case the convulsive phenomena are not continuous; they appear in the shape of a longer or shorter attack, which is repeated at very short intervals, in which the child remains without consciousness, and a prey to a dull agitation. In a child labouring under hooping cough, the convulsions lasted eighteen days in succession. There were three or four paroxysms a day.

When the convulsive attack is about to disappear, a general movement of relaxation is observed; the face becomes pallid, the eyelids droop, and the features express the most complete depression; the muscular movements become calmed, and are only observed at most distant intervals; the stiffness of the limbs disappears, and respiration resumes its usual course. The child generally falls into a most complete state of immobility, and sleep comes on to put an end to all these attacks.

Still it is not always thus; the nervous excitement, instead of diminishing, sometimes appears to increase, and the convulsive attacks terminate in death. "This may take place in two ways: either it commences in the encephalon—this organ, far too strongly excited, ceases to control the other organs; the respiration stops, the oxygenation of the blood does not take place, and death is certain—or it may begin in the lungs; the respiration, obstructed by the irregular contractions of the respiratory muscles, is only imperfectly performed; the lungs become engorged, the blood only partly permeates them; suffocation becomes imminent, and takes place if more regular movements do not appear so as to reëstablish respiration and circulation. Syncope may then come on and last a sufficient time to prevent the return to life." * It would appear to be not always an easy matter to determine the reality of death following convulsions. Several examples of mistakes are even reported in which children, who were believed to be lost for ever, have returned to life. And a few years since we might have read

* Brachet, *Des convulsions dans l'enfance.*

in the newspapers the account of a young child, already folded in its shroud and placed in a chapel, who was found the next day sitting up and amusing itself with the precious objects which were shut up with it. This is one of those errors of which I have reported so many instances in my researches upon apparent death, and which only happen to the ignorant and to persons unacquainted with medicine.* Care must then be taken not to arrive at a conclusion too hastily, and every precaution and every convenient attention must be made to bear upon the verification of the decease. The reality of death should only be confirmed after the complete and prolonged disappearance of the beatings of the heart as ascertained by auscultation.

The eclampsia which is not sufficiently violent to occasion death, does not always end without leaving traces of its occurrence. Some children recover their usual serenity immediately after the attack, and do not appear to have been ill. Others experience a slight febrile attack, which soon vanishes; they have often pains in the convulsed limbs, with ecchymoses on the surface of the skin, and a small number become deformed. The origin of certain permanent contractions which bring on deviation of the head or of these parts, retraction of the limbs, paralysis, &c., must be referred to the convulsions of the muscles. I have seen several children in whom torticollis had no other cause. The drooping of the upper eyelid, strabismus, irregularity of the mouth, several contractions of the limbs, often depend on this influence. These accidents are consequences of essential as well as of symptomatic convulsions; their relations with alterations in the brain is not more decided than are certain cases of facial and nervous paralysis noticed amongst hysterical persons. *Post mortem* examination does not reveal their cause in a clearer manner than that of the convulsive phenomena themselves.

It is the same with eclampsia, amongst certain very susceptible children, as with the nervous phenomena observed in hysterical women; relapse is very common. Supposing the general constitution has not been modified, it manifests itself under the influence of the most fugitive causes. A first attack predisposes to a second, and those who are subject to these conditions are a prey to these accidents several times at least in the course of their infancy.

When, amongst other subjects, the convulsive attacks manifest themselves in the course of an acute disease, they take the place of delirium, and cease, to appear no more as soon as the cause which produced them has vanished.

Diagnosis.

The convulsions of eclampsia, that is to say, essential convulsions, are

* *Traité des signes de la mort, et des moyens d'empêcher les enterrements prématurés.*

easily distinguished from the convulsions produced by diseases of the meninges, of the brain, and of the spinal cord, in consequence of the particular phenomena, febrile or otherwise, which constantly accompany these different affections. One disease alone, epilepsy, so nearly approaches that which we have just described, that, according to some authors, amongst whom must be reckoned Sauvages and Cullen, it is impossible to establish any distinction between them. The convulsive phenomena are nearly the same in both cases, only that in epilepsy, the attacks are of less duration, and are only reproduced at very distant intervals. Besides, they are manifested during the whole period of infancy, and continue beyond this epoch for the remainder of life.

Prognosis.

Under the head of their prognosis, eclamptic convulsions must be divided into two classes; those which are *primary*, independent of a morbid state which is about to appear, or indicatory of this morbid state, and those which are *secondary*, intimately allied to an acute disease which they are sometimes about to terminate.* The *primary* convulsions caused by dentition, intestinal worms, slight pains, heat, are the least important. Those which result from the bad quality of the milk of the nurse or from deviations in regimen yield less easily and often lead to death. But those which announce the commencement of certain eruptive fevers, and especially of small-pox, are of good omen. They predict, says Sydenham, a favourable eruption, slightly confluent, the progress of which will be natural and the termination always favourable. As to *secondary*, *terminal* convulsions, those which manifest themselves in the course of pneumonia, hooping cough, small-pox, &c., it is seldom that death does not prove their natural termination.

Treatment.

Every one has heard persons unacquainted with medicine state, with the greatest faith in the world, that the best means of curing a convulsive attack in a child, consists in putting a little salt on the end of the tongue. However absurd and ridiculous it may appear, still this prejudice contains an important truth; it shows the variety of therapeutical pretentions with respect to the disease we are now considering; it saves us the trouble of demonstrating that which it points out in the most explicit manner, for this opinion cannot be more clearly expressed, that convulsions are often cured by the efforts of nature alone and without medical interference.

However, it is not always so. A great number of cases of eclampsia,

* A. Dugès, *De l'éclampsie des jeunes enfants, comparée avec l'apoplexie et le tétanos. Mémoires de l'Académie de Médecine;* Paris, 1833; t. iii, p. 301, et suiv.

from the nature of their causes, remain distinct from those which must be left to themselves. These merit a special attention. How often these attacks have disappeared in consequence of the removal of a patient to a room less heated than that in which it previously was; how often after the removal of the pressure produced by a too tightly laced dress; lastly, how often after the cessation of pain occasioned by a pin which was so placed as to pierce the skin.

If the above attentions are not sufficient to calm the convulsive phenomena, we can, with some chance of success, try to produce a violent shock in the sensations of the little patient, by exposing it, stripped of its clothes, for several minutes in the open air, or by laying it on a marble table. So lively and so penetrating a sensation as this seldom fails to produce its effect.

When there is reason for supposing that the attack is the result of the introduction of too great a quantity of alimentary matter into the digestive apparatus, or of the introduction of indigestible food, an emetic should be given, or vomiting should be brought on by tickling the fauces with the end of a feather. A great number of cases of this nature in which this treatment has been crowned with success may be met with in authors and in medical periodicals. Copious evacuations bring to light lumps of apple, carrots, undigested beans, &c., which by their presence in the stomach had caused a severe internal disturbance and were quickly followed by the nervous phenomena to which we have alluded.

When defæcation is habitually difficult, and when there has not been any motion for several days, the abdomen must be felt and we must endeavour to find out by this examination if the intestines are distended by excrementitious matters. In this case a purgative should be given. Calomel in a dose of from one to three grains; manna dissolved in milk, two to four drachms to two ounces of fluid; emulsion of castor oil, in doses of from ʒi to ʒiij, are the most convenient means to employ amongst young children. If the child constantly voids fragments of tænia or of lumbrici, and even of ascarides, vermifuge medicines should be administered and their use persisted in until the entire disappearance of these entozoa results.

If the convulsions come on during dentition, and if the examination of the gums proves the existence of considerable tension of these parts, which the pain would imply, it may be reasonably supposed that a relation exists between the nervous phenomena and the dental evolution. It may be convenient to lessen the tension of the gums by a crucial incision or by excision at the point compressed by the tooth which is ready to pierce through. This operation, easily practised, attains a double end; it favours the dental evolution, and by the slight loss of blood which it causes, diminishes the congestion of the gum.

Sometimes convulsions accompany a similar determination of blood to the brain, if we may judge of the congestion of this organ from the congestion of the face. If the convulsions continue a long time, and if the colour persists without intermission, it is necessary to employ bleeding. The encephalic congestion has been the consequence of the first convulsive attack; once established it becomes a cause in its turn, and this it is which brings on the attacks. It ceases very quickly after the application of leeches. Two at most are sufficient; it is seldom necessary to increase the number, which indeed may be afterwards decided on if necessary. They are to be applied behind the ears, but more advantageously at some distance from the head, to the condyle of the femur or to the malleoli, as M. Chauffard recommends, in order to cause a revulsion of blood.

The convulsive phenomena must then be treated by means of anti-spamodic medicines. Orange flower water in a glass of sweetened water is the first thing the child should take. Then the oxide of zinc may be given either alone or combined with the extract of hyoscyamus, as recommended by M. Brachet. This medicine is very much in favour with those physicians who have turned their attention to the diseases of children. It should be given in a powder, to young children, mixed with sugar in the dose of one and a half to three grains in the twenty-four hours.

Oxide of zinc	1½ to 3 grains.
Sugar	15 grains.

Mix: divide into five or six doses.

The oxide of zinc has been combined with musk by MM. Guersant and Blache. These physicians have obtained very favourable results from it. Camphor, valerian, assafœtida in glysters are also employed with variously appreciated and very uncertain advantage. Most of the other anti-spasmodics have been in turn made use of without any one of them acquiring unanimous favour by its real value. The successful results of their exhibition can be reckoned up, but the unsuccessful cases are not mentioned.

Opium has been very often used in the treatment of convulsions; it appears to be especially efficacious in long-continued convulsions, and in those cases of convulsion which follow lacerations of the skin, pricks from a pin, &c. But here, as is always the case in the child, the employment of this medicine requires extreme prudence and very great precautions. It is likely to increase the cerebral congestion, and to bring on those nervous phenomena which we are desirous of curing. Besides, it causes a more or less obstinate constipation which is not always without danger. When M. Trousseau gives opium to children at the breast, he prefers laudanum in the dose of two drops to ʒj of the liquid vehicle.

Convulsions which are consequent upon anæmia and which are observed in children who have sustained considerable losses of blood, are advantageously treated by preparations of iron. The sub-carbonate of iron (Locock), well powdered filings may be indifferently used. Both of these substances are easily swallowed by children, when mixed with sugar or with an agreeable preserve. They may be given in doses of two to five grains a day.

APHORISMS.

122. In early childhood, hallucinations and eclampsia replace delirium.

123. In young children, the hallucination is characterized by movements of fear, and by gestures which seem to drive away or attract the object of prepossession.

124. Eclampsia results from a direct or sympathetic, primary or consecutive, disturbance of the nervous functions.

125. Eclampsia may be present without any material or appreciable lesion of the nervous system.

126. Eclampsia is generally hereditary.

127. A first attack of eclampsia predisposes to a second.

128. A sudden and rapid convulsion, unattended by fever, is not at all dangerous.

129. The eclampsia which attacks early infancy, and which continues to the period of childhood, becomes changed into an epilepsy.

130. Eclampsia causes partial paralyses, and these produce deformities.

131. Sudden, violent convulsions, followed by a prolonged drowsiness, but without fever, are indicative of epilepsy.

132. A sudden and violent convulsion, followed by fever, is always symptomatic of the incubation of an eruptive fever, or of a visceral inflammation, and announces great danger.

133. Convulsions at the commencement of small-pox are of good augury for the favourable termination of the disease.

134. The convulsions which terminate an acute or chronic visceral disease are nearly always symptomatic of a consecutive lesion of the brain and of the meninges.

135. The convulsions which accompany an acute disease are very serious.

136. The convulsions which appear as complications of pneumonia are fatal.

137. Fresh air, cold, and the sprinkling of the face with cold water are sufficient to ward off an attack of convulsions, but when once it has commenced they do not arrest it.

138. Those who pretend to cut short an attack of convulsions by

the aid of medicines, resemble those who shake an hour glass in order to hasten the invariable and regular progress of the sand it encloses.

139. The cause of the eclampsia must be especially ascertained in order to be enabled to prevent its return.

CHAPTER XIV.

ON SYMPTOMATIC CONVULSIONS.

The convulsions which depend upon anatomical changes in the nervous centres, or in their coverings, are not included under the title of eclampsia; they are termed *symptomatic convulsions*. They are connected with the following lesions: serous or sanguineous congestion of the coverings of the brain or spinal cord; acute or chronic inflammation of these membranes; inflammation of the brain or spinal cord; and, lastly, with accidental productions developed in these different organs.

It may here be observed that the convulsive phenomena lose all the individuality which essential convulsions presented. They are here the expression of a morbid anatomical condition of the nervous centres. They depend on these alterations in the most absolute manner; they are attacks which are secondary to these alterations.

Essential couvulsions have been previously described as one of those diseases the nature of which is unknown, and which it was necessary to particularize. The same cannot be the case with symptomatic convulsions, since their cause is evident and their nature apparent. The diseases in the course of which they appear must first be described. These attacks will then find place in the midst of the symptoms of these various diseases.

The history of the diseases of the nervous centres of young children, in the course of which convulsions are observed, will be described in succession. Meningitis, acute and chronic hydrocephalus, will be first studied; then encephalitis and tubercles of the brain will be considered, diseases seldom separate, nearly always combined with meningitis, if not primarily at least towards the termination; and we shall finish by meningeal hæmorrhage, and by that condition, so frequent amongst the newly-born, to which the name of apoplexy or apparent death of infants has been applied.

CHAPTER XV.

ON MENINGITIS.

The term meningitis is applied to inflammation of the membranes which envelop the brain, and separate it from the dura mater and cranium.

This disease is seated both in the pia mater and arachnoid. It has been very often confounded with certain diseases of the encephalon. It has hitherto been described under the names of *phrenitis*, *hydrocephalus*, *arachnitis*, *&c.:* terms at the same time too vague or too precise, which have been discarded by the best part of medical men.

The inflammation is seldom confined to the membranes of the brain. It is frequently accompanied by inflammation of this organ, by accidental productions, which are usually of a tubercular nature, and by a considerable effusion of serum into the ventricles. The complications described by the terms encephalitis and acute hydrocephalus offer only a secondary interest, and do not merit a place in the first rank in the description of meningitis.

Meningitis has for a long time been regarded as a decidedly inflammatory disease, the nature of which was always identical. Its anatomical characters have been described by a great number of authors with a constant uniformity. Some only, having been struck with the frequency of serous effusion into the ventricles, fixed their attention upon this phenomena, to which they wished to attribute too much importance in regarding it as the principal phenomena of the disease. They described it, consequently, under the name of acute hydrocephalus; but they were in error, for in these cases, although the changes in the meninges may be inconsiderable, they are still not the less well characterized. These are only cases of meningitis, and the effusion is but a secondary symptom.

More recently, when pathological anatomy became the object of a study, fruitful in proportion to its minuteness, several important characters were discovered in the disease we are considering, which began to modify the medical opinion on the subject of its intimate nature. Already Willis had observed that the cerebral symptoms were as easily caused by inflammation and by the suppuration of the meninges as by the nodosities and by the tubercles they enclose *(Nec minus a phlegmone et abcessu, quam hujusmodi meningitis et tuberculis nonnumquam cephalalgiæ lethales et incurabiles oriuntur).*

Bichat, in the preliminary observations of his treatise on general anatomy, speaking of diseases of the serous tissue, has observed—"Although the serous tissue is connected with the brain by the arachnoid, with the lung by the pleura, with the heart by the pericardium, with the abdominal viscera by the peritoneum, &c., it is a matter of indifference. It is in most parts inflamed in the same manner, in every part dropsies uniformly come on, &c.; every part is subject to a kind of eruption of small whitish tubercles, as if miliary, of which no mention has, I believe, been made, and which yet merits great attention." These remarks had been forgotten. M. Guersant, struck with the remarkable coincidence which existed between the usual affections of meningitis and the presence of granulations in the meninges, of tubercles in the bronchial glands and in the lungs, look on these children as phthisical who died from disease of the brain. But he declares* that he had no idea on the nature of these granulations, and that he dare not consider them as true tubercles. Other more enterprising individuals allowed themselves to be led by analogy, and compared these granulations with the miliary tubercles of the pleura and peritoneum. Dance, Rufz, Gérhard, Constant, Piet, supported this opinion; and more recently, M. Becquerel, in an excellent monograph, MM. Valleix, Barrier, Rilliet and Barthez, in their researches have given him the support of their talent, so as to cause it to be accepted in a definite manner. They have all erred, for microscopical analysis has shown, in an indisputable manner, that these granulations of the serous membranes and of the pia mater, are only composed of fibro-plastic tissue, and not of tubercular matter.

There are then two kinds of meningitis; one, long since recognized, the anatomical characters of which resemble those of inflammation of the serous membranes, is known by the serous or purulent injection and infiltration of the arachnoid and pia mater; the other, recently discovered, presents with these characters a greater or less quantity of small, whitish granulations, situated on the pia mater by the side of the vessels. These two kinds of meningitis are entirely different. The first bears the name of simple *meningitis*, the second that of *granular meningitis*.

1st. ON GRANULAR MENINGITIS.

Causes.

Most authors have made exclusive researches in order to discover the causes of granular meningitis; but no important discovery has resulted from them. No single circumstance accounts in a decided manner for the production of granulations in the meninges. The concurrence of two of them is at least necessary, one which

* *Dict. de méd.*, nouv. edit.

predisposes, the other which produces. In other words granular meningitis is not an accidental, local disease; it is a disease of the entire economy, which, in these particular cases, attacks the membranes of the brain.

The constitution of children labouring under granular meningitis is then the principal point which it is necessary to consider. The greater part present a more or less decided disposition to tubercles. They are born of tubercular parents; they have tubercles in the cervical or bronchial glands, in the lungs, or in the interior of some viscus. M. Guersant declares, as the result of his observations, that all the children who are attacked with this disease are more or less tuberculous, and he adds, that as yet he has only seen one exception to this general rule. This is a result of observation long since admitted in science, and adopted by all authors who have studied the diseases of children. This circumstance is of much interest to the physician; it explains to him why granular meningitis appears to be sometimes hereditary, like the general strumous disposition which is the origin of it. There are certain families which cannot succeed in rearing their children; they nearly all fall victims to tubercular meningitis, or to tubercles of the brain. If we refer back to antecedents, it is discovered that several brothers or sisters of the father or mother of the child have died of the same disease, and probably that the latter are tuberculous to a greater or less extent.

We do not pretend to maintain that this general disposition is sufficient for the development of granular meningitis. It requires, in addition, the combination of circumstances capable of determining the congestion or the inflammatory attack of the encephalic membranes. Then the causes which would have been without result in a healthy and vigorous infant, become, in the case we are now considering, the source of the most serious cerebral symptoms. We daily meet with children who present, with a marked febrile attack, unequivocal symptoms of cerebral congestion, characterized by fretfulness, cries, restlessness, congestion, and heat of the face and scalp, without any alteration capable of explaining these phenomena. We wait, ready to seize on new indications more characteristic of cerebral fever; then these symptoms disappear, and it is found impossible to give a name to the phenomena which have been observed. Yet are we aware of the consequence of this flow of blood to the brain? Who can say that it will not be the cause of the development of some fibro-plastic granulations of the same stamp as amongst other tubercular children? Pulmonary or pleural congestion become the sources of granulations of the lung or pleura; but no one attends to this, and yet this constitutes the whole of what is interesting in the etiology of granular meningitis.

It is very probable, if not certain, that granular meningitis and granular pneumonia make a similar progress. Granulations are formed in consequence of repeated congestions of the meninges or of the lung; they are perfectly developed when those acute symptoms appear which terminate the life of the patient. In fact, transient morbid phenomena, similar to that of which we have just made mention, are observed in the antecedents of those who die of granular meningitis, as in children who die of granular pneumonia; the disposition to bronchial catarrh has been proved. Lastly, *post mortem* examinations permit us to establish the presence of granulations in children who, carried off by another disease, have died of any other affection but that of the brain, an additional analogy with the granulations of the lung, which are so frequently observed in children who have died of a disease foreign to the thoracic organs. They are infinitely more rare in the pia mater than in the lung. There ulterior action is the same; they act as foreign bodies, and at last bring on inflammation of the tissues, which enclose them.

Thus then it is established, first, that granular meningitis is especially developed in children who are already labouring under the tubercular cachexia; second, that in these cases a latent inflammatory action is at work—an action capable of determining the formation of granulations; third, and lastly, that an acute inflammatory attack, occasioned by these granulations, or by any other cause, of no value considering their existence, becomes added to the established alterations, and puts an end to the life of the little patient.

From what has preceded, we may observe that the different circumstances relative to the age and sex of the children, those which are attached to the influences of temperature and to some more special causes, are of a secondary interest. We should be mistaken in their value if we believed they possessed some influence on the development of the disease we are considering, without the existence of the strumous disposition of which we have spoken. This important disposition has been just adverted to; let us now approach the second part of our subject.

Hereditary predisposition. I shall first speak of hereditary predisposition. Granular meningitis, like all the affections of a tubercular nature, is undoubtedly hereditary: only, there is one distinction to be made. The children of tubercular parents are observed to die after cerebral diseases of this nature. Last year, I had under my charge a little girl four years old, born of tubercular parents, who was carried off by granular meningitis—at least as far as I could judge from the duration of the premonitory symptoms, for the *post mortem* examination was not made. This year, in the same family, I attended another child, three years old, who presented a fresh instance of the same disease.

We also observe, and the fact is much more extraordinary, children attacked with granular meningitis, whose direct or collateral relatives have died of cerebral diseases developed under the influence of the tubercular diathesis.

Age. The predisposition due to age in the development of granular meningitis can only be appreciated in a suitable manner by the observations made by the same person upon a great number of cases, and in all periods of childhood. Without that, all statistics become useless. We are also obliged to cast aside those details in special treatises on the diseases of children: they are all made from observations collected from subjects attacked in their second year, and do not include children of one year old. This omission would, undoubtedly, modify the results; for children at the breast, like those more advanced in years, are subject to attacks of granular meningitis.

Up to this period it was not believed that this disease existed in young children, for no mention is made of it in the works of Denis and Billard. Still its existence at this age is, nevertheless, incontestable. MM. Blache, Guersant, Rilliet and Barthez, Barrier, have observed several examples of it; and I have collected six cases of this disease in the practice of M. Trousseau. The youngest child was only three months old, and the eldest had arrived at the end of his second year. No statistics can be based on so small a number of facts; the only value they have, consists in their overruling an opinion falsely accredited in medical science.

After the age of two years, the maximum of the frequency of this appears to be, according to M. Piet, between the sixth and the eighth year. Most of the other pathologists, on the contrary, place it between the second and the fourth year. Granular meningitis is also observed in the adult, but examples of it are very rare. Several have been reported by MM. Valliex and Lediberder.

Sex. The sex appears to me to have no kind of influence on the development of the disease we are now considering; and although the statistics of MM. Guersant and Becquerel would lead to the belief that it is more common in girls, I think that calculations made on a larger scale would, probably, quite alter this result, which is by no means irrevocable.

Seasons. The seasons have scarcely more influence than the sex, if we are to judge of this by the researches of pathologists. From those made by MM. Guersant, Piet, Rilliet and Barthez, it results that the disease is more frequent in the spring and in the summer, than during the wet and cold weather. However decided this proposition may appear to be, it is based on so small a difference of figures that great value cannot be attached to it. It is still necessary to wait, to give a decided opinion on this subject.

Granular meningitis is sometimes developed in consequence of blows or falls on the head, or after a lengthened exposure to the burning sun. These causes ought rather to be looked upon as coincidences; they are of a nature more likely to produce simple meningitis than granular meningitis. They become in these particular cases, the signal for the appearance of a disease previously formed in consequence of the special conditions which we have already mentioned.

The influence of dental evolution, the influence of measles and of eruptive fevers, of hooping cough, of several cutaneous and many acute diseases, explains itself in the same manner. The congestion of the brain which accompanies them, only favours the development of the tubercular meningitis, in consequence of the existence of a cachexia of the same nature; or rather, as one has often the opportunity of observing, these diseases, originating in a child of a lymphatic constitution, develop the strumous disposition which places them in the preceding category, that is to say, in such a state of susceptibility that the encephalic irritations are frequently followed by the formation of granulations in the pia mater.

Organic Alterations.

These changes are especially observed in the vesceral layer of the arachnoid, in the pia mater, and in the brain. The dura mater remains in the most perfect state of integrity; the sinuses enclose a larger quantity of blood than natural, according to M. Guersant, but M. Piet declares that the contrary is the case. (*Thesis:* No. 239; 1836.) The arachnoid, which lines the dura mater, is not sensibly changed; it is dry, adhesive, and does not usually present the anatomical changes caused by inflammation. The visceral layer is sometimes the seat of a considerable capillary injection, which may easily be confounded with the injection of the vessels of the pia mater. This mistake is the more easy as the transparency of the arachnoid allows the observation of the condition of the subjacent vessels. We might believe in the morbid colour of this serous membrane, when, simply, a considerable congestion of the pia mater placed beneath it exists. The cavity of the arachnoid sometimes encloses a small quantity of transparent or slightly reddened serum, without false membranes or flakes of albumen. Cases illustrating the existence of these last mentioned products are very rare. MM. Senn* and Becquerel† each relate an example of it.

The principal changes are observed in the pia mater. This essentially vascular membrane presents a reddish colour, more or less intense in proportion to the degree of congestion of its proper vessels; its tissue is traversed by vessels, the number of which appears increased in consequence of the inflammatory congestion. Their size is very

* *Recherches sur la méningite aiguë;* Paris, 1826.

† *Recherches cliniques sur la méningite des Enfants;* Paris, 1838.

variable; the largest are situated towards the base of the brain, and in the fissures of Sylvius, where they dive into the medullary substance. Its tissue is often infiltrated with an opaque or bloody serum, or with a whitish lymph, nearly coagulated, semi-transparent, or quite opaque. The infiltration is most decided at the base of the brain, in the interpeduncular space and on the surface of the organ, at the situation or the fissures which separate the convolutions. The thickening of the membrane is entirely in relation with the quantity of infiltrated matter.

This membrane which invests the whole surface of the encephalon and penetrates into its interior to a certain depth, to the deepest part of the furrows which cover the surface, can usually be detached with facility. In the different varieties of meningitis, on the contrary, it adheres with more or less force to the corticle substance of the brain. The traction which is exercised upon it brings away a part of this substance which presents a peculiar rough, reddish appearance, and is sprinkled with a large number of red points formed by the orifices of divided capillary vessels.

The adhesion of the pia mater to the brain is only observed in the most acute attacks of meningitis and in those which are accompanied by inflammation of the cerebral pulp. In this latter case, the adhesion is not at all general, it is more decided in one hemisphere than another, and in the parts which correspond to the most inflamed portions of the brain.

There are also found in the pia mater—and this is characteristic of tubercular meningitis—a greater or less number of rather hard whitish granulations, difficult to crush in the fingers, of very variable size, and placed in a peculiar manner along the vessels which they accompany in their course. The following are some of the characteristics of these granulations: they are seated almost invariably in the pia mater and in the thickness of this membrane. Some project towards the cerebral substance, on which they form a depression when they are very large; others are developed on the side of the arachnoid, which they lift up so as to produce a slight relief. They are very seldom found on the free surface of this serous membrane. A single case only has fallen under my observation. Miliary granulations nearly transparent, to the number of four, adhering by a little pedicle, were scattered upon the smooth surface of this membrane, which covered the left hemisphere to the situation of the internal face of the organ. But there was neither thickening nor false membranes, no old adhesions, which indicated a recent inflammation or referred back to one of a distant period. This observation confirms those of Dr. Barrier on the same point, and I agree with this author that "we are not to be supposed to have considered as tubercular granulations certain hard

and confluent indurations hardly visible and appreciable to the touch, which are sometimes met with on the free surface of the arachnoid, and more frequently upon the ventricular membrane in patients attacked with chronic meningitis. These indurations have no analogy with tubercular granulations, and are a kind of chronic inflammation which may be met with in the serous membranes of the brain as well as in those of the thorax and abdomen, for there are granular inflammations of the pleura and the peritoneum which are not at all tubercular."*

The granulations are then principally developed in the thickness of the pia mater and especially along the walls of the larger vessels. They are particularly observed at the base of the brain, at the summit of the hemispheres, in the interpeduncular space and in the fissure of Sylvius, which must be widely separated. They are more rare on the external face of the organ, upon the convex surface of the hemispheres according to MM. Guersant, Becquerel, and Barrier; but MM. Rilliet and Barthez state to the contrary.

[The predominance of the affection of the membranes at the base of the brain has been regarded by some writers as pathognomonic of scrofulous inflammation of the organ (Rilliet, *De l'inflammation franche des méninges chez les enfants. Archives de Médicine*, 1846-7); and though this rule is not without exception, it holds good in the vast majority of cases. West in twenty-five out of twenty-nine fatal cases of acute hydrocephalus, in which the condition of the membranes was carefully recorded, those of the base of the brain were found to be the seat of more or less extensive disease, and always more considerable than that which existed at the vertex.—P.H.B.]

They are often difficult to recognize either on account of their small size, or because they are enclosed by the infiltration of opaque plastic lymph in the tissues of the pia mater. In both these cases a more minute examination, either by the naked eye or by a microscope, leads to their discovery.

Sometimes they are very numerous, at other times their number is very small. Varying very much in size, some are scarcely visible; others, as large as a pin's head, are whitish, opalescent, exactly resembling a small portion of simple fibrine; others still larger are of a whitish yellow colour; lastly, some of them are observed of a different nature, being formed of tubercular matter, adherent to the pia mater and penetrating into the cortical substance of the brain. They are all very resisting under the finger and difficult to crush by pressure. The whitish miliary granulations which are observed on the surface of the pia mater have a certain consistency and tenacity which renders them difficult to tear with the needles used for the preparation for the microscope. These bodies are formed — 1st, of fibro-plastic elements, whether nuclei or fusiform fibres; oval-shaped cells are

* Barrier, *Des maladies de l'enfance.*

sometimes present, but not always. The nuclei are oval or spherical, generally very small, that is to say they hardly exceed in diameter $0^{mm},008$ to $0^{mm},009$ the presence of these little spherical nuclei must be insisted on, because with a less power than 5.50 diameters it would be sometimes impossible to establish the differences which separate them from the elements of tubercule; the fusiform fibres are small and rare. 2nd. There exists a considerable quantity of amorphous homogenous matter in which minute granulations are scattered; it is very dense and keeps the other elements strongly united together, so that it is difficult to isolate them completely. 3rd. Vessels are very rarely observed, the fibres of cellular tissue are also rare or altogether wanting.

I have never been so fortunate to observe, as some very noted authors have done (M. Barrier, for example) the insensible transformation of these fibro-plastic granulations from the simple small speck of whitish fibrine, which is the origin of it, to the tubercle which would constitute its last stage.

The intermediate point between these two extremes is always wanting, and it is even not at present better understood, whether the tubercles of the surface of the brain are not primarily developed in the cortical substance, and afterwards contract adhesions with the pia mater, or whether they do not originate in this membrane and then invade the brain.

The ventricles of the brain always contain a certain quantity of serum, sometimes so considerable as to stretch the lateral ventricles to an enormous extent, and to allow their communication in consequence of the laceration of the median septum. In a lesser degree, the effusion causes the simple dilatation of these cavities. The liquid is usually limpid and colourless; it is sometimes opaque and contains flakes of albumen. The choroid plexuses are very red, and occasionally enclose fibro-plastic granulations similar to those of the external pia mater. The internal membrane is seldom altered. The walls are softened, the fornix diffluent, and reduced to a creamy state. The same is also often observed on the internal surface of the corpora striata and optic thalamus.

The brain presents an unusual size, and appears as if it had been submitted to considerable pressure; the convolutions of the brain are flattened, and the fissures which separate them are less apparent. This disposition, moveover, coincides with the congestion of the medullary substance, which is the seat of very reddish roughening, and with the presence of a rather abundant effusion into the ventricles, the brain is evidently compressed, in consequence of the turgescence of the vessels which run through it, and by the increased distention of its ventricles by the effusion of serum.

The vascularity of the brain is especially very appreciable in young children. In the cases of meningitis, the centrum ovale of Vieussens is sprinkled by a great number of little red points placed very close together. The cortical layers are transparent, and traversed by a large number of small vessels; a reddish patch, interspersed with small red veins, has been observed.

The diminution of the consistency of the encephalic pulp is especially noticed in the cortical layers, the surface of which is often detached on raising the pia mater. It is also sometimes met with in the medullary substance, either in the central parts or in the walls of the ventricles. The softening of the central parts is usually observed around the tubercles which are found there situated; the softening of the walls of the ventricles always coincides with the presence of a considerable quantity of effusion in the interior. It is the result of maceration.

[Bouchut states that the softening of the brain is the result of maceration; many facts are however opposed to this view, fluid being in many instances found in the ventricles without the consistence of the brain being in the least diminished. Herrich states that central softening of the brain existed only in forty-seven out of seventy-one instances, in which the ventricles contained a quantity of serum, varying from three to eleven ounces. West remarks that out of twenty-eight cases of fatal hydrocephalus, in twelve there was not the least central softening, although the ventricles contained fluid in every case but one, and the quantity amounted on seven occasions to several ounces. Louis found in 75 out of 101 tubercular subjects, each ventricle contained a quantity of fluid varying from half an ounce to two or three ounces, but yet in six only of these 101 cases were the central parts of the brain at all softened.

Rokitansky has subjected the supposed hygroscopic property of the brain to the test of experiment, and found that no change whatever was produced in slices of cerebral matter by soaking them for hours in serum; he regards it as a condition of of acute œdema of the brain, often though not invariably associated with inflammation, since its products, pus and exudation corpuscles, are usually found in the broken down or infiltrated nervous matter.—P.H.B.]

Masses of a tubercular nature are often met with in granular meningitis in the interior or on the surface of the brain. These products present themselves under their ordinary characters. Some occupy the central parts, and have no kind of communication with the enveloping membranes; others are situated near the circumference of the organ, and although they are nearly always disposed in the encephalic pulp, they are sometimes in connection with the pia mater in a small portion of their extent; lastly, others, which are also situated on the surface of the brain, scarcely penetrate the cortical layers, and adhere exclusively to the pia mater, in which they appear to have originated.

The patients who die of granular and tubercular meningitis almost invariably present similar lesions in the other tissues of the economy, in the glands, in the bones, and in the parenchyma of the abdominal and thoracic viscera. This circumstance is very important to bear in

mind, when it is endeavoured to determine the nature of the disease we are now considering. The tubercular cachexia predominates in the organism; it betrays itself under the most varied forms. Pulmonary tubercles are most common; then in succession those of the bronchial glands or ganglions, the glands of the neck, the mesentery, the intestine, the liver, &c.

It is important to make mention of the tubercles of bones for two reasons—their existence is a proof of the strumous disposition of the child, and further, their seat is capable of exercising a very remarkable influence on the development of cerebral diseases. When these accidental products are present in the mastoid cells, and in the petrous portion of the temporal bone, a process of elimination is the result, which attacks the osseous parts close to the dura mater, and forms the starting point of the inflammation of this membrane and of those which are contiguous to it.

I have observed an instance, however, which appears to be inconsistent with the facts which I have pointed out. In a case of tubercular meningitis, the economy presented no other product of this nature which could demonstrate the existence of the strumous disposition. These are exceptional cases, I allow; they have been already pointed out by other observers, as Constant and Fabre,* and are adopted by those who have made a special study of the diseases of children. In early childhood the tubercular disease, limited to secondary organs, is often observed to run through its course without invading the important viscera.

To sum up, then, we observe that the anatomical characters of the granular meningitis of young children are, as regards the arachnoid, a condition of considerable dryness, sometimes a little injection, seldom with serous effusion and the presence of false membranes in its interior; as regards the pia mater, very considerable injection of its small vessels, serous and purulent infiltration of its tissue, especially at the base of the brain, its adhesion to the cortical layers and the formation of miliary, whitish, opaque fibro-plastic granulations, in the course of the vessels which it encloses.

In addition to these alterations of the meninges, a more or less abundant effusion into the verticles is met with, with or without false albuminous membranes, and often there is a softening of the walls of these cavities. In the remainder of the brain softening is very rare; it is especially observed at the circumference in the cortical substance, chiefly in the cases of encephalic tubercles.

Lastly, as a general tuberculous disposition, the very frequent presence of tubercles in the other organs of the economy has been mentioned.

* Guersant, *Dictionn. de méd.* Saussier. *Arch.*, 1839.

SYMPTOMS.

The symptoms of tubercular meningitis are easily appreciated in those children arrived at such an age as to give account of their sensations. Then the patient gives information of his sufferings, his pains of the head, the diminution of sensation, &c. In young children nothing similar is at all observed. The physician should make up for the information which is wanting by the sagacity derived from his experience. He should in this, as in every other disease, show himself to be a skilful physiognomist as well as a judicious observer of the moral and intellectual perversions.

Meningitis usually presents three distinct stages, admitted by Robert Whytt, Coindet, Senn, Guersant, Barrier, but denied by Piet, Rilliet, and Barthez. The first of the authors who admit this division, Whytt, formed his opinion simply from the state of the pulse; but this mode of examination is far from possessing that precision which is necessary to serve as the basis of a division. It is much better to establish it from the general examination and progress of the symptoms.

These three stages appear to me to be well characterized by these three words: *incubation*, *invasion*, *convulsion*.

The 1st Stage, or the period of incubation, has been imperfectly pointed out by authors under the title of the premonitory stage of the disease. Nevertheless, it is one which it is very important to recognize, and which enables us to predict the tubercular meningitis which is about to declare itself. It forms one of the most valuable diagnostic elements of this disease, for it does not exist in simple meningitis.

This stage is characterized by transient, intermittent derangements, apparently not serious ones, sustained in the sensations and intelligence of the children.

Marked changes take place in the habits of the little patient. It disdains the toys which formerly pleased it; pushes them aside and fretfully breaks them. Those children who were the companions of its games, displease it; it looks upon them with a melancholy and mournful air, without wishing to take part in their amusement. Becomes dull, taciturn, apparently absorbed in profound meditation; nothing allures it; neither the caresses of its mother, which it receives with indifference, nor the seductions of other children, which it repulses with anger.

At night time, apparitions seem to haunt it, and to break upon its sleep. Waking with a start, it utters peculiar cries, and casts affrighted looks around. It throws itself into the arms of its mother, where it sleeps, but scarcely is it put back into its cradle, when it again awakes uttering the same cries. Sometimes it appears to see animals, and it desires them to be driven away; it perceives them on the bed-covering, and tries to catch them with its hand to remove them.

There is no continuous fever; but occasionally in the course of the day, at indeterminable periods, the return of which is very irregular, its skin becomes burning, the thirst increased, and all ceases to resume its usual course.

It scarcely complains; it sometimes indicates that its head is painful, but does not dwell upon it. Noise and fright seem to cause it some uneasiness. The limbs are sometimes so painful, that all pressure is insupportable. The faculty of walking is then destroyed, but usually these derangements of motion are not present.

The child has less appetite than usual; it is more capricious and more difficult to please on the subject of the food which is offered it. Nevertheless, the functions of the stomach are well performed, and digestion is regularly carried on. In some patients, the alternations of diarrhœa and constipation are observed.

These symptoms are intermittent, they last one or two days, and almost entirely disappear. They return afresh to disappear again; coming in with very variable degrees of intensity, and at last entirely cease, or give place to the symptoms of the second stage.

Moreover, Hippocrates thus points them out:* "As for children, they are attacked with convulsions if the fever is acute, if the alvine evacuations are deficient, if they are troubled by sleeplessness and sudden terrors, if they utter groans, change colour, and if the face becomes yellow, livid, or red. These symptoms attack the youngest children most readily up to the age of seven years."—Works of Hippocrates (*Prognostics* 24).

This opinion is repeated (*Cocæ Prænotiones* 109). "In young children an acute fever, suppression of stools with insomnia, sobbing, changes of colour, followed by the persistence of a red tint, are symptoms of a convulsive state."

It is in the first stage that the disease can be charmed away, and arrested in its progress. It lasts from eight days to a month, and sometimes more. Pending its duration, the flow of blood to the meninges favours the production and the development of new fibro-plastic granulations, up to the moment when having become the source of too active an irritation, they, in their turn, cause inflammation of the meninges, which is recognized by the following symptoms.

2nd Stage—period of invasion. In this stage the continuity of symptoms is more marked than in the preceding one. The fever still remains under the form of irregular intermitting type; at the commencement there are horripilations and restlessness, which do not escape the attentive eye of the mother.

Headache. Amongst those children arrived at an age capable of expressing their sensations, the existence of headache can be determined.

* *Œuvres complètes trad. par Littré*; t. ii, p. 187; t. v, p. 607.

It is sometimes very violent, and appears limited to one point of the head alone, at the top for instance, at the back, or at the temporal regions.

Vomiting. It is very seldom that the children do not vomit at this period of the invasion of the disease. The ejected matters are composed of food or liquids mixed with bilious matters. The vomitings are repeated every day, or several times a day, according to the patients. This symptom is seldom wanting; in a total of eighty observations taken from different authors, this symptom was present sixty-six times.

Constipation. This is the most constant phenomena of the invasion of granular and tubercular meningitis; it is present in nearly all the patients, except those attacked with entero-colitis, which very often happens in tubercular children.

The children are excited or depressed by turns. In the first case their temper is passionate, they are very irritable; the few words they are able to speak, they pronounce with a peculiar intonation, which should be appreciated by the physician, for it is not natural to notice the speech short and imperious in a child. If they are depressed, they are observed to find out a convenient spot for sleep, which is unfortunately too slight, being disturbed by the least noise or by headaches. In this state of sleep, they grind their teeth and move the jaws incessantly; their face is pale, and is constantly covered by a rapid blush, which disappears in a few seconds; their features are contracted; the knitting of the eyebrows gives to their physiognomy a sombre character, to which is added an air of disdainful suffering, depicted by a wrinkle situated outside the alæ of the nose, formed by the contraction of the nasal and naso-labial muscles. The eyes are very sensible to the impression of light, they are violently closed on its approach. They struggle with great force against the hand which seeks to raise the eyelids for the purpose of examining if the pupils are contracted or dilated. Dance looked upon this as a certain sign of acute hydrocephalus. Lastly, according to the observations of Odier of Geneva, the pupils may present great oscillations.

Cries. Whether awake or asleep, the child appears constantly subject to great uneasiness; it is restless, or raises itself up and utters a long piercing cry, described by Coindet under the name of the hydrocephalic shriek, accompanied, according to the age of children, by complaints which explain the cause of it. Most frequently, in this case, the shriek is extorted by the pains in the head; otherwise, it is the result of the agitation of the children: it should then be considered as constituting their delirium.

At the end of the second stage, which lasts from eight to ten days, the fever is continuous, with frequent exacerbations in the day and night. The circulation is violently disturbed. The pulse, sometimes

from 110 to 120 pulsations, descends to 80 or 90. It presents numerous intermissions. In exceptional cases it has been observed as low as forty-eight (Guersant). There are no rigors, but the perspiration is sometimes very abundant. The temperature of the skin is very much raised for some little time, and then falls, to return to its natural state. It sometimes descends below this state in children weakened by previous diseases (Guersant).

The respiration is in relation with the circulation, as regards the irregularity and intermittence. The inspirations succeed each other hurriedly, and stop all of a sudden for some seconds, so that in one minute not more than twelve or sixteen respiratory movements are observed.

This last symptom, with which we meet again in the third stage of the disease, is most important in relation to the diagnosis. It possesses a very great semeiologic value in the cerebral diseases of children.

3rd Stage—Convulsive Period. This stage commences as soon as the moral annihilation, and coma succeed the exaltation sustained in the acts of sensation. It seems as if the organism is fatigued by a struggle too much above its power, and that it gives itself up entirely to the evil which oppresses it.

Then the children appear to lose by degrees their knowledge of existence. Their faculties, slightly developed as they are, seem annihilated. They scarcely answer questions addressed to them, and their speech, instead of being short and imperious, appears embarrassed, slow, and separated from the period of interrogation by a long interval. Soon after they understand without being able to reply, give the hand which is asked for; and then there is an end, any noise no longer strikes their ear; they still exist, but they are entirely separated from the exterior world.

The sensibility of the limbs and of the organs of sense are similarly weakened. The eyes, which could not bear the impression of light, regard it without pain. The pupils are more dilated than in the second stage, and are subject to the same movements of oscillation.

Light no longer causes painful sensations in the head. The limbs have lost that exquisite sensibility which rendered pressure exercised on them insupportable. The hydrocephalic cries cease. All the perceptions are weakened, and are finally extinguished. It is very rare to see children preserve the free exercise of their senses, or only the possibility of their exercise, to the period of death. Not less remarkable phenomena of perversion of motion are observed in this period. In the midst of a profound coma, which succeeds to drowsiness, rigidity, permanent or alternating contraction of the limbs and of the trunk, paroxysm of convulsions, and lastly, paralysis are observed.

Spasm. The rigidity of the trunk is announced by the turning back of the head, or by its inclination to one of the sides of the neck. The face has a wild expression; the eyes often immoveable, directed upwards or downwards, appear to hide themselves under the upper eyelid. The teeth are closely drawn together in consequence of the spasm of the muscles of the jaw, the resistance of which it is impossible to surmount. In the limbs the same stiffness is observed. It is accompanied by a certain degree of flexion of the fingers, which are bent upon the thumb, and the toes are turned towards the sole of the foot.

Convulsions. The convulsions are observed under the form of more or less frequent paroxysms; an internal spasm accompanies them. They commence by a kind of effort and contraction in the inspiratory muscles. The respiration stops, the face reddens; the eyes, the parallelism of which is sometimes destroyed, turn in their orbit, become fixed and turned up under the upper eyelid. The upper extremities are convulsed, small jerks operate on the fore arms, and bring them in a state of semiflexion. Convulsive movements agitate the wrists, the fingers, and the toes; then, at the end of a few minutes, all is quiet; the face becomes pale, the arms relax, and lie along side of the body, the toes resume their position, and the child falls into a most complete state of prostration. The attacks, at first distant, insensibly increase in frequency; towards the end of the disease, the convulsive state loses its intermittence, and is changed into permanent convulsions.

Paralysis. Paralysis is usually observed in the course of this stage. It is present in most of the children, it follows convulsions; it is sometimes confined to the face, or only attacks one side. The regularity of the features is thus observed to be destroyed by the drooping of the eyelid, which no longer covers the organ of vision, by the falling of the nostril of the same side, and sometimes, though much more rarely, by the deviation of the opposite side of the mouth.

When the paralysis invades the trunk or the limbs, it is especially under the form of hemiplegia that it is manifested. The arm and the leg, still feebly under the influence of the convulsive movements, are no longer strongly flexed by the voluntary action of the muscles. If they are raised and let go, they drop by their own weight. If the skin is pinched, the child makes no attempt to avoid the pain; while on the opposite side, although the same state of relaxation exists, in consequence of the loss of consciousness, the pain caused by pinching the skin is revealed by movements sufficiently strong to raise the limb and change its position.

In some cases the paralysis extends from one side of the body to the other; it only attacks the arm of the opposite side, for the child dies before it can extend itself further.

In the whole course of this stage, the pulse maintains a considerable degree of frequency. It is raised in young children to 140 or 160 pulsations a minute. It does not present the intermissions which were observed in the preceding stages. The skin preserves a degree of temperature in proportion to the frequency of the pulse. The face always presents the alternations of pallor and colour, which we have above mentioned.

The thirst is considerable, but it comes on at a time when it is difficult to satisfy it, on account of the closure of the jaws. The mouth is dry. Vomitings are no longer observed, but constipation persists so obstinately that it is often difficult to overcome it.

The respiration presents the same modification of frequency as previously pointed out in the second stage. It is performed with rapidity, but the inspirations are shallow, followed immediately by a *sighing effort* of inspiration, and by a repose of some seconds. So that, on superficial examination, the respiration might be thought to be very frequent, while it does not exceed the ratio of twelve or sixteen a minute. It becomes rattling and stertorous as death approaches. Then the face becomes blue, is covered by a cold sweat, and life ceases in the midst of convulsions.

The duration of this convulsive state lasts from six to ten days. In some cases it is not prolonged beyond the eighth day.

Duration.

If the accounts of authors are to be believed, meningitis may be prolonged for one, two, or three weeks. Green has collected 117 observations taken from Abercrombie and Constant, and he found that

31	patients	died	before	the	7th day.
49	„	„	„	„	14th day.
31	„	„	„	„	20th day.
6	„	„	after	the	20th day.
117					

Such results are far from being conclusive, for the calculations have been made on the supposition that the stage of invasion is that of the commencement of the disease. But, however, it is preceded by another stage, which we have called the stage of incubation, the duration of which is sometimes of great extent. Thus I have had the opportunity of seeing a child of four years old who laboured under considerable nervous disorder, restlessness, and cries during the night, sadness, fretfulness, dulness during the day for a month, and at last finished by having an attack of meningitis, terminating in death on the fifteenth day. In this case the meningitis had lasted forty-five days. In order to judge of the duration of this disease it is necessary to calculate in a

somewhat different manner from that which has been hitherto followed, and to reckon from the true commencement of the symptoms.

[Of twenty-eight cases recorded by Gölis (*Praktische Abhandlungen, &c.*, 1820 ; vol. i) eighteen terminated within fourteen days, and only two exceeded twenty days. MM. Rilliet and Barthez (*Op. Cit.*, vol. iii, p. 497) state that the average duration of twenty-eight cases that came under their observation, was twenty-two days ; and the average duration of thirty fatal cases of which West kept complete record was twenty and a half days. Of these thirty cases, that which ran the most rapid course terminated fatally in five days ; death took place in ten more before the fourteenth day ; and in eleven others during the third week, and in three during the fourth week. In the remaining five cases, indications of cerebral disturbance had existed for four, six, or eight weeks ; but death took place in every instance in less than twenty-one days after the appearance of well marked symptoms of hydrocephalus. West concludes that we are warranted in stating that the disease usually runs it course in from two to three weeks.—P.H.B.]

Terminations.

Granular meningitis has sometimes a favourable termination. MM. Parent and Martinet, Rufz, Green, Charpentier, Guersant mention cases of cure ; but all these authors are unanimous in declaring that if the return to health is possible, it is before the passage of the disease to the third stage. Cases of cure are sufficiently rare before the second stage, consequently nearly all of them must be referred to the first stage. I have also had the opportunity of having under my treatment several children at the commencement of this disease, and they were cured. Yet several examples of the cure of granular meningitis in its third stage are cited, but these cases are exceedingly rare.

Diagnosis.

The differential diagnosis of granular meningitis is the most difficult point in its history. Yet in the symptoms of this disease, a certain number of characteristics may be discovered, the incontestable value of which allows a precise diagnosis to be formed.

Granular meningitis may be confounded with simple meningitis, encephalitis, tubercles on the brain, and typhoid fever. However, it must be here observed that encephalitis and tubercles of the brain, in the acute stage, are usually allied with meningitis ; their symptoms are mingled with those of this latter disease in such a manner that it is impossible to distinguish one from the other.

This is not the case with simple meningitis, which appears accompanied with sufficiently distinctive characters to separate it from granular meningitis. The diagnosis is established from the appreciation of the following circumstances. Tubercular meningitis appears most frequently in children who present old or recent traces of strumous disease. Its invasion is not instantaneous, it develops itself after

having presented morbid phenomena, too often unrecognized, and which have previously been detailed in the stage of *incubation*. The progress of the disease is insiduous, and even after the period of invasion some uncertainty hangs over the nature of the symptoms which cannot be clearly referred to a cerebral disease. The sudden changes in the colour of the face, the blushes which cover it and immediately disappear, however, belong to this disease.

No similar symptom exists in simple meningitis, which can only be confounded with tubercular meningitis by dating from the time when the convulsive stage commences. Then trismus, contraction of the limbs, tetanus, convulsions, are common phenomena, the form of which is the same for both these diseases.

Tubercular meningitis can only be confounded with typhoid fever in those patients who have passed the age of two or three years; for before this period, this fever is very rare and its existence is far from being demonstrated.

In children of more advanced age, the commencement of typhoid fever and of the eruptive fevers is sometimes signalized by attacks which have the greatest analogy with those of meningitis. Uneasiness, nervous agitation, delirium, vomiting, constipation, combined with a more or less intense fever, are sometimes the cause of the mistake. With regard to the simple meningitis it is possible, but it cannot be with regard to tubercular meningitis, if what has been said on the subject of the antecedents of the disease, and especially on the stage of incubation, which is wanting in the case supposed, is duly taken into consideration.

[Great care must be taken not to confound this affection with the hydrocephaloid disease, or spurious hydrocephalus, which is produced by *anæmia* of the brain, a diminution of its natural supply of red blood; a condition, in fact, diametrically opposed to that which produces acute hydrocephalus. Dr. Gooch (*On Symptoms in Children erroneously attributed to Congestion of the Brain*) gives a very graphic description of this disorder. It is chiefly indicated, he says, by heaviness of the head and drowsiness. The age of the little patients whom he had seen so affected, was from a few months to two or three years; they were generally small of their age, and of delicate health, or had been exposed to debilitating causes. The physician finds the child lying on its nurse's lap, unable or unwilling to raise its head; half asleep; one moment opening its eyes, and the next closing them again with a remarkable expression of languor. The tongue is slightly white, the skin is not hot—at times the nurse remarks that it is colder than natural; in some instances there is now and then a slight and transient flush. In all the cases that Dr. Gooch saw, the bowels had been already disturbed by purgatives; the symptoms had invariably been attributed to congestion of the brain; and the remedies employed had been leeches and cold lotions to the head, and purgatives—especially calomel. Under this treatment the patients had gradually got worse, the languor had increased, the pulse became quicker and weaker, and at the end of a certain number of days the children had died. In two instances he had known coma to come on during the last few hours, stertorous breathing, and dilated and motionless pupils.

Dr. Marshall Hall (*On the Diseases and Derangement of the Nervous System;* 1841; chap. v, sect. iii) describes a very similar set of symptoms. "This affection," says he, "may be divided into two stages: the first, that of irritability; the second, that of torpor. In the former there appears to be a feeble attempt at reaction; in the latter, the powers appear to be more prostrate. These two stages resemble, in many of their symptoms, the first and second stages of hydrocephalus respectively.

"In the first stage the infant becomes irritable, restless, and feverish; the face flushed, the surface hot, and the pulse frequent; there is an undue sensitiveness of the nerves of feeling, and the little patient starts on being touched, or from any sudden noise; there are sighing and moaning during sleep, and screaming; the bowels are flatulent and loose, and the evacuations are mucous and disordered.

"If, through an erroneous notion as to the nature of this affection, nourishment and cordials be not given, or if the diarrhœa continue, either spontaneously or from the administration of medicine, the exhaustion which ensues is apt to lead to a very different train of symptoms. The countenance becomes pale, and the cheeks cool or cold; the eyelids are half closed; the eyes are unfixed, and unattracted by any object placed before them, the pupils unmoved on the approach of light; the breathing, from being quick, becomes irregular and effected by sighs; the voice becomes husky; and there is sometimes a husky, teasing cough; and eventually, if the strength of the little patient continue to decline, there is a crepitus or rattling in the breathing; the evacuations are usually green; the feet are apt to be cold."

The distinctive characters of this spurious hydrocephalus are—the pale, cool cheek; the half shut, regardless eye; the insensible pupil; the interrupted, sighing respiration; in addition, Watson points out the indication afforded by the state of the unclosed fontanelle. If the symptoms proceed from plethora, or inflammation, or an approach to inflammation, the surface of the fontanelle will be found convex and prominent; but if, on the other hand, the symptoms originate in emptiness and want of support, the surface of the fontanelle will be concave and depressed; when, moreover, the symptoms are ambiguous, the judgment concerning the true nature of the disease will be much aided by tracing the manner in which they come on, and the causes to which they may be attributed.—P.H.B.]

Prognosis.

Granular meningitis is one of the most formidable diseases of infancy. It seldom allows those it attacks to escape, and there is always room for doubting that those cases of reported cure were rather those of simple acute meningitis. Nevertheless, I believe that granular meningitis may be arrested in its progress by the use of proper remedies, and I believe that if it can be cured, it is especially in its first stage, frequently even at the commencement of the second, but very rarely indeed in the third when the convulsions are established.

["Tubercular meningitis," writes M. Guersant (*Dict. Med.;* t. xix, p. 403) "may sometimes terminate by recovery in the first stage, though the nature of such cases is always more or less doubtful; in the second stage I have not seen one child recover out of a hundred, and even those who seemed to have recovered have either sunk afterwards under a return of the same disease in its acute form or have died of phthisis. As to patients in whom the disease has reached the third stage, I have never seen them improve even for a moment."

Watson (*Lectures on Practice of Physic;* vol. i, p. 418) states that this stage is

often attended with remissions sometimes sudden and sometimes gradual—deceitful appearances of amendment and even of convalescence. The child regains the use of its senses; recognizes those about him again; appears to his anxious parents to be recovering; but in a day or two it relapses into a state of deeper coma than before. And these fallacious symptoms of improvement may occur more than once.—P.H.B.]

Treatment.

The termination of granular or tubercular meningitis is usually so fatal, that we must not hesitate in treating it by prompt and energetic remedies. The degree of the disease must be determined in as precise a manner as possible, that is the stage in which it exists, in order that we may not deceive ourselves as to the efficacy of the means that we may employ. Thus the success of its medical treatment, employed in the symptoms of the first and second stage of the disease, can be more surely reckoned on than in the symptoms of the third stage. In order to give a convenient direction to the treatment of tubercular meningitis, the subject should, therefore, be divided into two parts. In the first, the treatment which must be used during the stage of the germination will be mentioned, and afterwards that will be pointed out which is proper during the two united stages of invasion and of convulsion.

1st. The children should be kept in the most perfect state of quietude, free from all agitation and from all intellectual excitement. The phenomena which they exhibit at this first stage deserve the most careful study; and the physician, directed by the attentive observation of these phenomena, taking into consideration the more or less decided strumous constitution of his patients, their individual resistance, should carefully investigate the state of the circulation, in order to decide as to the employment of antiphlogistic remedies.

They are contra-indicated in those cases where the children are in a state of advanced tuberculization, and in the absence of febrile reaction at the time of the commencement of the symptoms.

However, as the derangements which are observed are evidently the result of an internal commotion, accompanied by a determination of blood to the membranes of the brain, if the strength of the pulse allows, and in the fear of seeing the symptoms increase, a certain quantity of blood may be abstracted. This abstraction should be made even with a lancet; and if the operation is impossible in very young children, the application of leeches to the legs, or behind the ears, may be substituted. In this manner two spoonfuls of blood may be taken away, or four leeches may be applied without fear of weakening a child at the breast too much, and the quantity may be increased in proportion with the age.

The constipation, which is usually observed at this stage, ought

to be carefully attended to, because, in the first place, there is every advantage in establishing a function which does not perform its duty, and because the simple stoppage in the passage of the excremental matters, may give rise to cerebral symptoms, which resemble, to a certain degree, those of meningitis, and secondly, because the employment of purgatives determines a revulsive action in the intestine, capable of removing the symptoms developed in the head. Calomel, in the dose of from one to three grains, is of easy administration. If it produces no effect, the syrup of buckthorn should be given in the following manner:

Syrup of buckthorn	℥ ss. to ℥ j.
Decoction of prunes	℥ ij.

Mix: to be taken in two doses, fasting.

Compound syrup of rhubarb, rhubarb in powder, jalap, &c., may also be employed in like manner, care being taken to calculate the doses according to the age of the children under treatment.

One of the best means of treating the stage of germination of meningitis, is the establishment of a permanent cutaneous revulsive, either at the arm or at the back of the neck, and by preference in this last region. The seton, cautery, or the blister, must be decided on according to the intensity of the phenomena, without having too great a regard to the considerations of sex, on which the parents always in this case lay too much stress. It is right, however, to have some regard to the apprehensions which the formation of a wound, behind the neck of a daughter, should give rise to in the mother. These means should be only made use of under the most absolute necessity. In this case we must not hesitate, for any complaisance would be culpable, and would become a great crime. Of these three revulsions, the blister, well applied and daily dressed with an epipastic ointment, is that which is to be preferred. It has quite as much efficacy as the cautery or the seton, and it possesses the advantage over them of leaving a less disagreeable scar, especially if its establishment has been of short duration.

2nd. At the commencement of the second stage, when the meningitis is in full activity, a decision must be promptly formed, and recourse had to a course of treatment energetic in proportion to the severity of the symptoms. Bleeding from the arm, from the foot, or from the jugular vein, is of real efficacy; it lessens the febrile phenomena, and diminishes the cerebral excitement, which may be recognized by a cessation of the cries, and of the delirium of the child.

[The real efficaciousness of bleeding from the arm, foot, or the jugular, even at the commencement of the second stage, on which Bouchut so much insists, may be rather called into question. On this point the observations of West are very just:

"With reference to depletion, you must not forget that the disease in which you are about to employ it, although of inflammatory nature, is inflammation in a scrofulous subject, and is in many cases grafted on previous organic disease, such as those tubercular deposits in the membranes of the brain which I have already described to you. You cannot, therefore, hope to cut short the affection by a large bleeding, but your object must be to take blood enough to relieve the congested brain, and no more than is necessary for that purpose. Avoid precipitancy in what you do, and do not let your apprehensions betray you into that over activity which is sometimes more fatal to a patient than his disease. If you feel any doubt as to the necessity of depletion, visit your patient again before determining on it, but do not delay that visit long. Order a dose of calomel, to be followed by some sulphate of magnesia, if, as is most probable, the bowels be confined, and return again in three or four hours. You may then find that the bowels have acted, and the sickness has ceased; that the head is cooler and aches less, and that depletion is, for the present at any rate, unnecessary. Or the child's state may be the same, and you may still feel uncertain as to the right course. It is only at the outset of the disease that its cure is possible; when convulsions have occurred, or coma is coming on, your treatment matters comparatively little, for the season of hope and the opportunity for action have then fled.

"Though you may have determined on the propriety of depletion, it will be seldom found, even at the outset of the disease, that the character of the pulse is such as to warrant venesection. Local bleeding will generally answer every purpose, and the age and docility of the patient will determine whether it shall be performed by cupping or by the application of leeches. I will not say that this depletion is never to be repeated, but I believe that in by far the greater number of cases you will do no good whatever by its repetition, and the exceptional cases will generally be those in which, very marked relief having followed the first bleeding, the same symptoms of congestion of the brain appear to be returning twenty-four or thirty-six hours afterwards. If you do not see the child until the second stage of the disease is far advanced—till general convulsions have occurred, or twitchings of the limbs or of the muscles of the face, an appearance of extreme alarm, or a state of alternate contraction and dilatation of the pupils, show them to be impending—you must be exceedingly careful in abstracting blood. Under such circumstances I have seen convulsions, to all appearance, induced, and the fatal course of the disease accelerated by a rather free though by no means immoderate loss of blood."—P.H.B.]

It is often impossible to have recourse, amongst young subjects, to the employment of general bleeding, which it is necessary to replace by local abstractions of blood, notwithstanding all their inconveniences. Thus, for instance, children are fearful of leeches. If they are applied to the head, a very marked congestion of this part, calculated to aggravate the cerebral symptoms, often result from their use. Nevertheless, the susceptibility of the patient must be tried. In those cases, in which the fear of the leeches is not too considerable, one or two of them at most may be applied on each mastoid process, to be repeated the next day, and again the day after, if the constitution of the patient authorises it, and if the severity of the symptoms renders this operation necessary. In opposite circumstances the leeches ought to be placed on the knees or on the

ankles. Cupping, applied by a skilful hand, can be advantageously made use of instead of leeches, and one should always make use of this means, so slightly painful, which allows the calculation of the quantity of blood abstracted, and which always avoids the risk of hæmorrhage.

The application of leeches to the interior of the nostrils, or the scarification of the mucous membrane of the septum of the nasal fossæ, has been proposed with the view of rapidly emptying the vessels of the interior of the head. The first of these means is inapplicable amongst children; as for the second, it has been practised by several physicians, and by M. Guersant in particular, who has not derived any advantages from it. It is equally with a view to modify the cerebral circulation that M. Blaud (of Beaucaire) has proposed, and it is said employed with success, compression of the carotid arteries. I do not in the least doubt these results, but what I wish to discover is, the means of compressing the carotid arteries without interrupting the circulation in the deep jugular vein. Now, it is true that by this compression the flow of blood to the brain is hindered, but an obstacle is also put to the return of that already there, and thence results a state of stupor which may easily lead to asphyxia; for the eyes are agitated, consciousness disappears, and the respiration becomes embarrassed under the influence of this practice; that is what every one can prove if he will make the experiment upon himself, as I have done, and continue it only for the space of five minutes. He will then judge of the efficacy which this operation is likely to possess in the treatment of tubercular meningitis.

Refrigerants external to the cranium are often employed, and their use appears very rational: still they do not possess a very great efficacy. The application of compresses moistened with cold water, ice in a bladder and laid on the forehead, are bad remedies, which, by causing too considerable alternations of heat and cold, are rather noxious than useful to the child. If it is wished to employ refrigerants, recourse should be had to continual irrigation. The patient is not to be disturbed in its bed; the head should be placed on a cushion, the hair being cut very short; the neck is bound moderately tight by an impermeable stuff, so placed on each side as to form a gutter, so that the water which has been used in the irrigation can run off from each side of the bed without wetting the body of the child. Having arranged these, a jar filled with water of a moderate temperature, 64° Fah., is placed above the patient, a syphon with a tap is to be placed in the jar to moderate, at will, the flow of the liquid. To this tap is fastened a skein of loose thread, for the purpose of conducting the water to the forehead, so as to avoid the continuous dropping of the liquid, which would be insupportable.

If the irrigation ought to be discontinued, the water should be gradually made warmer, and this plan of treatment should not be suddenly interrupted, so as to avoid the symptoms of reaction which follow the application of cold. When the apparatus is taken away, compresses, moistened with cold water, should be applied to the forehead for a day afterwards.

Mercurial frictions to the neck, axillæ, and previously shaved scalp, at one time were in high estimation. Abercrombie extolled them; it was declared that M. Guersant was a partisan to them, and had obtained some advantages from their use. Later experience has contradicted these successful results, but points out their efficacy in simple meningitis. Their utility in tubercular meningitis remains doubtful: they can only be of service at the commencement of the disease. They should be omitted when they have determined salivation—a very rare circumstance amongst young children.

While making use of these remedies, dictated by the nature of the disease, we must not neglect to fulfil the indications which the other symptoms furnish. The vomitings should be treated by means of antiperiodics; impure quinine *(quinine brute)* for instance, in doses from one eighth to half a grain; the extract of bark; or by means of sedatives and opiates; or even by antispasmodics; orange flower water; cherry laurel water, in doses of ten drops; ether, in the same dose; the tincture of valerian; castoreum; &c.

Opiates have the inconvenience of increasing constipation, but they are very useful in calming the state of cerebral excitement of young infants. Laudanum should be given in a draught, in a narcotic dose at short intervals, gradually increasing the dose of it until sleep is obtained.

Purgatives are always useful in this disease: they should be administered early, because it is necessary to keep the bowels freely open in children attacked by meningitis; afterwards, because there is hope that their employment may cause an action of intestinal revulsion favourable to the lowering of the encephalic circulation. Calomel should be given every day, in the dose of three fourths to one and a half grains, and continued until diarrhœa necessitates the intermission of its employment.

[Dr. Leopoll (Casper's *Wochenschrift;* 1850; No. 37) states, when calomel is administered in the acute hydrocephalus of young children, there may be signs of mercurial salivation present, even when there is no salivation. The tongue, moist at its tip and red at its edges, exhibits grey stripes, proceeding from behind forwards to its middle part, intercommunicating behind and separating in front. The appetite, which may have improved, now falls off, the face exhibits great moroseness, and the child is impatient and ill tempered. Mercurial fever is present, and these symptoms are of very favourable augury.—P.H.B.]

Great advantages are also obtained by cutaneous revulsives, made

at short intervals, by means of foot baths of mustard and water; by sinapisms, or even by blisters to the legs. This last means should only be proposed in the stage of convulsion, and after the other resources have been exhausted. It is also in the same stage, and in the same circumstances, that the application of a large flying blister to the previously shaved head is to be decided on. This treatment has been often employed by physicians, but has scarcely ever been successful. The advantages derived from its employment are especially evident in simple meningitis, or acute hydrocephalus. Many children owe the preservation of their existence to this energetic remedy. The flying blister can be very well replaced by frictions of tartar emetic upon the scalp. These frictions should be made with an ointment thus composed:

Lard	℥ j.
Potassio-tartrate of antimony . . .	2 drachms.

To be used three times a day until a confluent eruption is produced.

Issues made by potassa in alcohol or by Mayor's instrument, and the seton in the back of the neck, are not very useful in this stage of the disease. They should only be employed in the stage of incubation and in chronic hydrocephalus.

Various empirical means have been proposed for granular meningitis: the iodide of potassium, fifteen grains in the course of the day; tartar emetic, in doses of three quarters, one and a half, and two grains, combined with opium, digitalis, squills, phosphorus; but all these remedies are of doubtful efficacy, and do not recommend themselves by any facts that can be relied on.

Lastly, it is necessary, in order to assist the successful operation of all these remedies, to put the patient on the most strict system of diet, and to prescribe the use of thin and cooling drinks. If the febrile reaction is not too considerable, and if the disease is prolonged, a slight alimentation may be allowed, whether broth or milk, to avoid too great a prostration, and to prolong the days of the patient.

APHORISMS.

140. Granular meningitis is peculiar to early childhood.

141. Granular meningitis is always developed amongst scrofulous and tubercular children, or the issue of parents themselves tainted with tubercles or scrofula.

142. Granular meningitis announces itself, a very long time in advance, by intermitting phenomena, which are—want of appetite, fits of sadness or of anger, depression, fright, and nocturnal hallucinations.

143. Vomitings, constipation, and a considerable fever, combined

with a short, incomplete, intermittent and *sighing* respiration, announce an attack of meningitis.

144. Sudden reddening of the countenance and its consecutive decolouration, alternating in short intervals during the fever, are the forerunners of convulsions.

145. The extreme sensibility of the eyes to light, and the permanent closure of the eyelids, without ophthalmia, in a child labouring under fever, are signs of meningitis.

146. Granular meningitis accompanied by sharp cries or by convulsions is almost invariably fatal.

2ND. ON SIMPLE ACUTE MENINGITIS.

Simple meningitis is observed rather frequently among children at the breast. According to some authors—Billard, Baron—it would at this age replace tubercular meningitis. However, I do not believe that this proposition is correct; and my opinion is founded on the abstract of fifteen cases of meningitis collected amongst children of from eight days to thirty months of age, an abstract in which I find ten examples of granular meningitis, four examples of simple meningitis, and one of acute essential hydrocephalus. I can reasonably apply, then, to children at the breast, the proposition laid down by M. Guersant with respect to the subject of the frequency of meningitis amongst children of two to fifteen years. Agreeing with this author, I would state that as regards all children, the number of cases of simple meningitis is infinitely inferior to that of tubercular meningitis. It is only after puberty that simple acute inflammation of the meninges is the more frequently met with.

Pathological Anatomy.

The anatomical characters of the simple meningitis of children are very nearly the same as those of tubercular meningitis. If we except the granulations which form the essential sign of this last variety, the alterations in the arachnoid, in the pia mater, and in the brain are similar; only, the plastic and purulent infiltration which takes place in the network of the pia mater, and the distention of the ventricles are more decided.

I do not agree, with MM. Rilliet and Barthez, that we can refer to tubercular meningitis certain cases of simple meningitis, namely, those without granulations in the meninges and without cerebral tubercles, simply because tubercular productions exist in other parts of the economy. The inflammation of the meninges which is developed in a child who has tubercular cervical glands, or a tubercular affection of the knee joint (white swelling) ought not to be considered as a tubercular meningitis if there are no granulations in the meninges.

It is as if we would call a tubercular pneumonia that which attacks a child who has no pulmonary tubercles, because other organs are filled with these morbid productions.

Often, it is true, the physician, guided by the evident tubercular constitution of children who present cerebral or thoracic symptoms, supposes he can diagnose either a granular meningitis or a tubercular pneumonia: this is, in fact, very probable; but he should not fear to avow his error, or to change his opinion, if the autopsy affords him the opportunity of proving the absence of granulations in the meninges or in the lungs.

Symptoms.

The symptoms of simple meningitis differ from those of tubercular meningitis, especially when they are studied at the commencement of the disease. Attention must be paid to the commemorative history, in order to find out the antecedents of the child, and to discover if in its life, or in that of its parents, there are not traces of scrofulous disease. The commencement of simple meningitis is always instantaneous; there are, on the contrary, in tubercular meningitis, more or less prolonged precursory symptoms, which do not escape an attentive examination. These are the phenomena which have been collected in the stage of incubation of tubercular meningitis, as may be seen on referring to the preceding chapter.

With the exception of this fundamental difference in the morbid expression of the commencement of simple meningitis, the other symptoms do not differ much from those of tubercular meningitis. Here, the progress is more rapid; the symptoms less uncertain; the phenomena better characterized; but there are no positive signs on which we can rely, in order to make the diagnosis certain. For that which relates to the symptoms of this disease, the reader may refer to the details of the diagnosis and symptoms of the two last periods of tubercular meningitis.

Etiology.

The causes which favour the development of simple meningitis are as numerous as they are varied. They very much resemble those of tubercular meningitis.

There is, however, one which appears to be peculiar to that variety we are now considering; this is epidemic influence. It was in fact known that the acute meningitis of adults could be developed under this form, but it was not established that the same could be the case amongst children. The account published by Dr. Albert *(Journal de Hufeland)* removes all doubt on this point. The facts may be learnt by the extract which MM. Rilliet and Barthez have given in their work.

Termination.

In this respect, great differences separate acute from tubercular meningitis. Acute meningitis may terminate by death, by recovery, or may pass into the chronic state. The favourable termination is no longer one of those facts which can scarcely be credited, and which is called in question if we have not observed it ourselves. Numerous examples attest the possibility of the cure which is more easily obtained in sporadic acute meningitis than in epidemic acute meningitis.

After the return to health, there sometimes remains for a long time derangement of the intelligence or of motion. In some children, the aptitude for application appears lost, and the mind develops itself with difficulty. Amongst others, weakness in the limbs of one side of the body, and sometimes hemiplegia, or paralysis in one or several of its forms, are observed. As the child grows older, this paralysis disappears. It happens in some that the disease leads to a complete idiocy, or an incurable paralysis, or becomes transformed into a chronic hydrocephalus, of which M. Guersant reports an instance. This termination is very rare. The hydrocephalus develops itself nearly always in a slow and insensible manner, without any precursory acute phenomena being present.

Treatment.

The considerations which have been brought forward in the chapter on treatment of tubercular meningitis in the acute stage, here find their place. They are applicable to the treatment of simple meningitis. The indications to be fulfilled in the two diseases are the same; the congestion of the meninges must be diverted at any cost. The task is more simple in the one case than in the other. The same remedies are to be made use of in order to succeed; therefore it does not appear necessary to repeat what has already been said on this subject.

[Gölis (*Praktische Abhandlungen, &c.;* vol. i, case 2) records some cases of simple encephalitis under the name of water-stroke; the following case affords a good specimen of the most acute form of the disease:

"A little girl, fourteen months old, who was healthy and strong and fat, was suddenly seized at five o'clock in the morning, after a restless night, with violent fever and frightful general convulsions. Medical assistance was at once obtained, and in less than thirty minutes from the commencement of the attack, four leeches were applied behind the ears, which drew three ounces of blood; calomel and other remedies were administered internally, and mustard poultices were applied to the soles of the feet. These measures soon alleviated the symptoms, but the relief only lasted a very short time; the fever returned as intensely as before, convulsions came on again, with opisthotonos, and the child became comatose. Hemiplegia succeeded; the pupils became extremely contracted; complete loss of vision, and spasmodic twitching of the muscles of the face, soon followed, and thirteen hours after the first

convulsive seizure, in spite of most appropriate and energetic treatment, the little child died.

"The vessels of the scalp were loaded with blood, and the skull was so intensely congested as to appear of a deep blue colour; the sinuses were full of coagulated blood mixed with lymph, and all the vessels of the brain and its membranes were enlarged and turgid with blood.

"A large quantity of coagulated lymph covered the convolutions of the brain and the corpus callosum like a false membrane, and furnished a delicate lining to the lateral ventricles, whose walls were softened and in part broken down. The ventricles contained about ℥ iij of turbid serum, and there was a considerable quantity of lymph at the base of the brain."

Dr. Abercrombie (*On Diseases of the Brain, &c.;* case x, p. 52) relates the following interesting illustration: "A child, aged two years, 21st May, 1826, was suddenly seized in the morning with a severe and long continued convulsion. It left her in a dull and torpid state, in which she did not seem to recognize the persons about her. She had lain in this state for several hours, when the convulsion returned, and during the following night it recurred a third time and was very severe and of long continuance. I saw her on the morning of the 23rd, and while I was sitting by her, she was again attacked with severe and long continued convulsion, which affected every part of the body, the face and the eyes in particular being frightfully distorted. The countenance was pale and expressive of exhaustion; the pulse frequent, her bowels had been fully opened by medicine previously prescribed, and the motions were dark and unhealthy. Further purging was employed, with topical bleeding, cold applications to the head, and blistering. After the attack she continued free from convulsion till the afternoon of the 23rd, in the interval she had remained in a partially comatose state, with frequent starting; pulse frequent but feeble; pupils rather dilated; she took some food. In the afternoon of the 23rd the convulsion returned with greater severity; and on the 24th there was a constant succession of paroxysms during the whole day, with sinking of the vital powers, and she died early in the evening.

"On removing the dura mater, the surface of the brain appeared in many places covered by a deposition of adventitious membrane betwixt the arachnoid and pia mater. It was chiefly found above the openings between the convolutions, and in some places appeared to dip a little way between them. The arachnoid membrane, when detached, appeared to be healthy, but the pia mater was throughout in the highest state of vascularity, especially between the convolutions; and when the brain was cut vertically, the spaces between the convolutions were most strikingly marked by a bright line of vivid redness, produced by the inflamed membrane. There was no effusion into the ventricles, and no other morbid appearance."—P.H.B.]

CHAPTER XVI.

ON TUBERCLES OF THE BRAIN.

There are three kinds of tubercles of the brain. Some, primarily developed in the pia mater, have encroached upon the cortical layer, and have extended to the medullary substance; others, which from the cortical layers have advanced to the pia mater, with which they

have only a slight adhesion; and lastly, those which are completely enveloped in the cerebral substance, and situated either superficially or deeply in the organ.

The tubercular matter of the brain presents the same characters as that from other viscera; only it is very rare to meet with it in a state of infiltration. It presents itself most frequently in a crude state, with a very decided greenish yellow colour.

The size of these productions is very variable; some of them are enormous. Their density differs: they gradually pass through the varied stages, from the state of the induration of tubercle to the pulpiness of softened tubercle.

The cerebral substance which surrounds them preserves its ordinary characters as long as the product remains in a state of crudity. It inflames, becomes red from infiltration of blood, and softens at the same time as the tubercle. A more or less considerable effusion into the ventricles then takes place.

The meninges are often affected, and present the granulations of which we have made mention while on the subject of tubercular meningitis. These two cases must be here distinguished from each other; either the child dies in consequence of an affection foreign to the brain, of a tubercular or inflammatory nature, or it is carried off by a cerebral disease. In the first case, if tubercles are found in the brain, it is rare to meet with granulations in the meninges; yet they are sometimes there observed. In the second, at the same time that there are encephalic tubercles, there are meningeal granulations. This is a rule which offers few exceptions.

Children who have tubercles in the brain, have also very often tubercles in the other viscera. The tuberculization of this organ is only the extension of a general disease, already manifested in the lungs and in the bronchial glands, or in the viscera of the abdomen, in the glands of this cavity, and in the glands of the neck.

The symptoms of tubercles in the brain are very nearly the same as the symptoms of tubercular meningitis. The symptoms of the *stage of incubation* of this latter disease are here observed even much better characterized. In fact, tubercles of the brain, like the meningeal granulations, save with very rare exceptions, reveal themselves a long time in advance without occasioning fatal symptoms. How often do we observe in children transient phenomena of cerebral congestion, striking nervous symptoms which have no other cause.

I have observed in a child the appearance of a sharp pain in the cervical region, accompanied by a retraction of the sterno-mastoid muscle of the left side. The head was drawn from this side. These symptoms disappeared. They appeared again three weeks afterwards, but at the same time there was fever, nocturnal agitation, and startled

awakening. The child woke all of a sudden with a shriek, and was quiet when the mother arrived. During the day it had sudden terrors which nothing could account for. The digestion was not disturbed, it played willingly, and did not otherwise appear ill. A second time the child returned to health. It had a fresh attack and rapidly died, in consequence of a cerebral affection which presented the symptoms of tubercular meningitis.

I obtained permission to make the autopsy, and I found, in addition to meningeal granulations, two tubercles in the cerebellum and a tubercle in the annular protuberance, the substance of which was red and the surrounding parts softened.

In this patient there is reason to believe that the muscular retraction and the nervous symptoms were due to the encephalic irritation, caused by the presence of tubercles. These transient congestions determined the formation of meningeal granulations, and secondarily the meningo-encephalitis, which caused the death of the patient.

The symptoms of tubercles of the brain are then at the commencement, very analogous to those of granular meningitis. When these products determine acute symptoms the similitude is still greater, and we cannot do better than refer to what has been said on the subject of this disease.

The consideration of the etiology, the prognosis, and the treament which are also applicable under these circumstances will there be found.

[MM. Rilliet and Barthez discovered tubercle in the brain in 37 out of 312 children, between the ages of one and fifteen, in some organ or other of whose body this morbid deposit existed; they consider it to be less usual before than after three years of age; but according to Dr. Green, its period of greatest frequency is from three to seven years of age; and in seventeen out of thirty-two cases recorded by Dr. Mauthner, the age of the children did not exceed three years; and the same was the case with reference to seven out of nine fatal cases that came under the notice of Dr. West. Dr. Hennis Green (*Medico Chirurgical Transactions;* vol. xxxv) mentions pain in the head as the most constant cerebral symptom, having met with it as a prominent feature in the disease in seventeen out of twenty cases.—P.H.B.]

CHAPTER XVII.

ON HYDROCEPHALUS.

The term hydrocephalus is applied to the effusions of serum which take place in the interior of the cranium.

This disease presents itself under many forms which it is difficult to appreciate. It offers considerable differences in its progress and on

account of the numerous causes which determine it. It is impossible to study it conveniently without establishing several preliminary distinctions necessary to insure the clearness of the description.

The first is founded on the appreciation of the rapid or slow progress of the cerebral symptoms, or on the intensity of the frebrile reaction, whence *acute hydrocephalus* and *chronic hydrocephalus.*

The second division is based on the very nature of the disease. Thus, as hydrocephalus may depend on an anatomical alteration of the brain, or, on the contrary, may exist independently of these alterations, it is thought more correct to adopt, with respect to this disease, the generally received division of dropsies, a division in which the word *essential* or *symptomatic* specifies the absence or the presence of anatomical alterations of the tissue. We shall then have to consider separately *essential* and *symptomatic*, acute or chronic hydrocephalus.

1st. ON ACUTE HYDROCEPHALUS.

There is, then, a symptomatic acute hydrocephalus and an essential acute hydrocephalus.

1. *Symptomatic acute hydrocephalus.* We often meet with children attacked by an acute disease of the meninges or of the cerebral pulp, who present at the same time a considerable serous effusion into the arachnoid or into the ventricles. In these circumstances we agree with the greater number of authors, that the formation of the fluid should be considered as the result of the lesion previously established, as a complication or as a symptom of the primitive disease.

Such is symptomatic acute hydrocephalus. It is met with in meningitis or encephalitis, cerebral tubercles, &c. It does not constitute, then, a special pathological state, and cannot be separated from the diseases to which it owes its origin. Its history entirely belongs to the description of the diseases which have engendered it.

2. *Essential acute hydrocephalus.* This term belongs to those effusions of serum which are formed in the interior of the cranium, in the absence of any alteration of the brain or of its envelopes.

It is a very rare disease, of which few well authenticated examples are to be found in authors. MM. Abercrombie, Andral, Bricheteau, Martin Solon, have published several cases of this kind. Three are to be found in the work of MM. Rilliet and Barthez; two with effusion into the cavity of the arachnoid, and one with effusion into the ventricles. As we cannot multiply facts of this nature too much, I will relate a recent case which occurred in the practice of M. Trousseau, at the Necker Hospital.

Acute hydrocephalus—pulmonary tubercles. A boy of ten months old: has always been well up to the age of seven months, has already had descrete small-pox. He has been ill three months. He had at first several distinct attacks

of some cerebral phenomena; two, three, and even four convulsions in a day; they returned at ten or twelve days' interval; for three weeks he has not had any convulsions, but he has had a very strong fever of a remittent character; no diarrhœa nor constipation; no vomiting; a little cough, but at rare intervals. The appetite is deranged, he does not eat, and sucks very little. Naturally gay, he has become serious; he cried and wept while the pain lasted; since three weeks he no longer weeps—he is continually whining.

He was a patient at the Cochin Hospital, where leeches were applied (two to the abdomen, one to the anus); but he went out not cured, and he was admitted into the Necker Hospital, St. Julie Ward, No. 10.

A very plump child, very white, pale face, large head, blue eyes, haggard, expression of heaviness and sadness, continual groaning, sleep frequent and of short duration, waking takes place by a start, which appears very painful, and is accompanied by a sharp cry.

Cough unfrequent, a little sibilant ronchus in the chest, no dyspnœa. Abdomen large, slightly distended; stools soft, without diarrhœa; no vomitings; skin moderately warm; pulse 140.

April 2. Face pale, puffy, remarkable expression of heaviness; the expression of suffering (contraction of the eyelids and the nostrils) is also remarked; continual groanings, little sleep. The sleep only lasts a short time, wakes with a start and a sharp cry like that of fear; at the same time the face is slightly convulsed and there are spasmodic movements in the limbs.

The child sucks well, and often nothing is given him to eat; no motion; skin natural; pulse 138.

Antispasmodic draught; two doses of calomel of $\frac{3}{4}$ grain each.

April 3. Nothing new.

Antispasmodic draught; two doses of calomel of $\frac{3}{4}$ grain each.

April 10. State of remarkable suffering, characterized by the alteration of the features, groans, sharp cry, and continual movement. The face, pale and puffy, becomes slightly coloured during the cry, and redness is perceived on the forehead and temples, and then the veins are observed to swell. The sleep is frequently interrupted by wakings with a start followed by convulsions of the eyes, trembling and contraction of the limbs. The child sucks often; he eats nothing; skin warm; pulse 162.

Two doses of calomel.

April 15. This child was found in the same state at this morning's visit. Towards noon, vertigo seized him, and in the midst of cries and agitation, a convulsion appeared; the eyes were fixed, slightly diverging; the limbs stiffened, the face became bluish black, and in a few minutes he died.

Autopsy, ten hours after death. Although the head and the body of this child are very large for the age to which he is arrived, there is yet a very marked relative predominance of the volume of the head over the volume of the trunk. The dimensions of the cranium are in relation with those of the face. The bones of the head are not at all altered. There is no separation of the sutures. The brain is firm and consistent; the convolutions are not at all flattened. There is slight serous infiltration at the superior and anterior part of the hemispheres. The membranes in the rest of the brain are healthy. The cerebral substance is white, without injection, and contains no accidental production. The only lesion observed, is the dilatation of the lateral ventricles by a reddish serum. These cavities, the exact extent of which could not be appreciated, were of about twice the capacity of the normal state. They each contain about $\overline{3}$ ij of clear, limpid serum, without false membranes. The walls are firm, pale, in no way altered. The other ventricles are not at all dilated.

The lungs are pale, resisting, and marbled by red spots sprinkled over their surface. These spots, formed by the engorged lobules, are hard and do not float in water; their exterior is red, livid, rather dense; it cuts smoothly and gives the appearance of carification; they are not numerous. Besides the small and thinly scattered nuclei of lobular pneumonia, there is a little congestion at the posterior and inferior part of the organ. But this is not all; there exists under the pleura and in the interior of the pulmonary tissue a considerable number of transparent granulations due to the presence of tubercular matter in its first stage of formation. Some may be described as consisting of a vesicle in the midst of which is an opaque tubercular granulation. It is these granulations which by their number give to the lung the density which has been described.

The bronchial glands are very much enlarged and are completely degenerated into a very hard opaque yellow substance, analogous to crude tubercular matter; no gland has become softened.

The heart is enormous, relatively to the age of this child; it is as large as that of a child of four years; it is twice the size of the first of the subjects. The hypertrophy is chiefly confined to the left ventricle, the cavity of which is equally enlarged.

The organ is filled with very fluid clots, without fibrinous concretions.

Abdomen. The mesenteric glands are very numerous, a little hypertrophied, but without having undergone degenerescence. White streaks are observed in the mesentery due to the presence of chyliferous vessels which lead to these glands; when they are cut, a milk-like liquid exudes.

The liver is very large; beneath the peritoneum, but above the capsule, large numbers of miliary granulations are observed, which might be called tubercular, but of the nature of which we are ignorant.

Similar granulations existed in the interior of the slightly enlarged spleen.

They are innumerable.

The other organs are healthy.

It would be a matter of great difficulty to explain the development of the hydrocephalus we have just described. There was no trace of inflammation in the meninges nor in the encephalon; none of those accidental productions which could produce the irritation of the brain, none of those lesions which some pathologists regard as the causes of the effusion of serum into the ventricles and of their dilatation, could be discovered.

Granulations of the meninges have almost always been met with in connection with hydrocephalus; thus MM. Rufz, Guersant, Becquerel, &c., have thought that these accidental products were the cause of this disease. There was nothing of the sort however in the foregoing case; the meninges were sound, and there were no tubercular granulations. The lungs, on the contrary, were filled with these productions.

Essential acute hydrocephalus is characterized anatomically by the effusion of serum into the ventricles, into the arachnoidean cavity, or even into the thickness of the cerebral pulp itself.

The meninges present no alteration except a slight serous infiltration. The effused liquid is never in very great abundance. Its quantity

varies from ℥ ij to ℥ v. The substance of the brain is usually firm or slightly softened in those parts which are in contact with the liquid. This is often the case with the fornix, and the septum which separates the lateral ventricles. The creamy softening of the brain only exists in those cases of general serous infiltration, in the essential hydrocephalus, for example, which succeeds scarlet fever.

The symptoms of this disease are very obscure: they all indicate a disease of the brain, but there is not one of them which specifies its particular nature. As may be observed in the case related, and which is, perhaps, an advantageous type to consult, the child had had, for some time, convulsions, nocturnal frights, wakings with a start, stiffness in the limbs; its character became changed, it groaned incessantly, uttered sharp cries, and then, at last, a convulsion put an end to these symptoms.

These symptoms relate quite as much to the symptoms of encephalic tubercles, as to the symptoms of essential acute hydrocephalus. It would be impossible to establish a precise diagnosis of any value. Much better is it, like most physicians, to confess our inability to do so, than to seek to hide it by a minute discussion, which is rather detrimental than useful. Essential acute hydrocephalus is seldom a primary disease. Most of the cases which have been published are to be referred to cases of hydrocephalus, consecutive pneumonia, tubercles of the lungs, as in the patient whose case we have reported, nephritis, measles, scarlet fever, &c. M. Barrier has especially called the attention of his professional brethren to this latter variety, which he established on authentic observations, commented on with much talent and interest.

2ND. ON CHRONIC HYDROCEPHALUS.

Chronic hydrocephalus cannot be considered in the same manner as acute hydrocephalus; it is impossible, for instance, to divide it into essential and symptomatic hydrocephalus.

This disease constantly presents itself under the same form; it is under the absolute dependence of vices of organization, or of accidental lesions of the encephalon. It is, therefore, always *symptomatic*.

The hydrocephalus sometimes develops itself several months or several years after birth, but it is usually congenital.

Acquired hydrocephalus is very rare, and appears to result from a chronic inflammation of the meninges; from the presence of tubercles; from acephalocysts in the brain, &c. In these cases the disease is never of a very long duration; it terminates rapidly by death, giving rise to the train of symptoms which will be pointed out further on.

Congenital chronic hydrocephalus is the most common variety. It

commences in the mother's womb, and finishes its development after the birth of the child, if, indeed, it is not the cause of its death during labour.

The seat of the effusion is very variable. It may be situated, 1st, between the dura mater and the bones of the cranium; 2nd, between the dura mater and the arachnoid; 3rd, in the cavity of the arachnoid, and at the exterior of the encephalon; 4th, in the ventricles of the encephalon; 5th, in the laminated and vascular tissue of the pia mater. These divisions are borrowed from M. Breschet. They will be found in the article *Hydrocephalus* (*Dict. de Méd.*, nouv. édit.); the most satisfactory paper which has been published on this subject.

Causes.

The causes of congenital hydrocephalus are to be especially referred to vices of conformation, and to morbid alterations of the brain. Whether the arrest of the development of the different parts of the encephalon be the result of a disease, the nature of which we are ignorant, or of a vice of the *nisus formativus*, the hydropsy is not less the consequence of it, and it is impossible to penetrate the mystery which surrounds its appearance.

Besides these important facts in the etiology of hydrocephalus, there are others to which attention has been called. Thus, the effects of the imagination of the mother, her moral impressions, her sorrows, &c., have been added to the number of the causes of this disease without anything justifying the value of this influence. More importance must be attached to the diseases of the mother during gestation, and to a weakness, natural in consequence of age or of previous disease. These causes may concur to the development of hydrocephalus.

There are some women who have a fatal predisposition to give birth to monsters of this sort. J. Frank relates the case of a woman who had seven pregnancies, all terminated by the birth of a hydrocephalic child. Gœlis speaks of another person who was confined six times, and each time the child was dead, and laboured under this disease.

The compression of the abdomen by belts, or by a too tightly laced corset, in persons who wish to hide their pregnancy, can, it is said, produce this disease; and this statement is supported by the fact that hydrocephalic children are more frequently born to single than to married women. The influence of the moral impressions which overwhelm women in this sad situation, must be also added to the influence of the compression of the abdomen.

Amongst the other causes which have been regarded as likely to concur to the development of hydrocephalus, must be cited the habit of drunkenness in the father; blows upon the abdomen of the mother, and falls during pregnancy; the twisting of the umbilical cord around

the neck of the child; compression of the head by forceps, or by the manœuvres during a protracted labour; and, lastly, after birth, the immoderate shakings of the cradle, and the compression of the head by too tightly fitting caps.

As to the influence of scrofula, of intestinal worms, of diseases of the alimentary canal, of spirituous excitants given to children, &c., it is useless to stop to consider them. These influences do not appear to us to have the slightest relation with the development of hydrocephalus.

The causes of acquired hydrocephalus are nearly always related to chronic affections of the brain, or of its envelopes. In this respect meningeal hæmorrhage occupies the first rank; it often becomes the origin of arachnoidean hydrocephalus. The blood becomes enclosed in a cyst, the clots disappear, and a quantity of serum, which every day becomes more considerable, supplies its place. The acquired hydrocephalus is also the consequence of chronic meningitis, tubercles of the brain, or of other tumours developed in this organ, &c., &c.

Anatomical Lesions.

The anatomical alterations of hydrocephalus are developed in the cranium and in the brain.

The volume of the head is usually increased in consequence of the separation and enlargement of the bones of the cranium, which become flattened and considerably extended, superficially in order to cover in the spaces which result from the separation of the sutures. The cranium thus acquires enormous dimensions, varying from sixteen inches in young children to thirty-six inches in children of from ten to twelve years of age. J. Frank reports having seen in the museum of Cruikshank, the head of a hydrocephalic patient sixteen months old, which was fifty-two inches in circumference.

The increase in the volume of the head is one of the most common anatomical characters of hydrocephalus; occasionally this symptom offers some exceptions. In many cases the cranium is not too much developed, it is proportionate to the age of the subject. Gœlïs and Gall have witnessed similar facts; Baron and Breschet report several examples of this. They have seen the cranium filled with serosity, the encephalon imperfectly developed, without the head being of larger size than usual, in children attacked with congenital hydrocephalus the existence of which they had not suspected.

The enlargement of the head is confined to the vault of the cranium. The base preserves the ordinary dimensions. The same is the case with the bones of the face. The relative proportions of these parts are disturbed; the harmony of the face is destroyed, and thence results a strange physiognomy characteristic of the disease which we are now considering.

Case. A young boy four years old died of hydrocephalus at the Hospital for Children:

His head was 18 inches from one auditory meatus to the other.
20 inches from the nasal spine to the occiput.
26 inches in circumference.

He preserved the use of his senses up to a very advanced period of his existence. It was only a few days before his death that he lost his hearing, sight, &c.

The fluid was contained in the lateral ventricles which were dilated at the expense of the hemispheres, the substance of which had disappeared. Each hemisphere was converted into a pouch, the walls of which were one sixth of an inch in thickness and appeared composed of grey and white cerebral matter. The convolutions were flattened but visible. The membranes were healthy, and eighty-three ounces of liquid were enclosed in the dilated ventricles.

In the cavity of the ventricles the septum medium was seen; it was from five to six inches in height, for the two ventricles were separated. The corpus striatum, the optic thalamus, the choroid plexus, were still visible on the right side; on the left all these parts with the exception of the corpus striatum. The fornix had nearly disappeared. There was no alteration in what remained of the cerebral substance.

The bones of the head sometimes preserve their natural thickness (Aurivill, Malacarne, Hartell); most frequently they are thinned, and become as weak as a sheet of paper. They are transparent, flexible, yield easily to pressure as if they had been deprived of their saline ingredients and were reduced to their organic elements (Breschet). Their texture is quite peculiar; their porosity is very great and they offer round each point of ossification a radiated disposition very readily recognized. Their angles are rounded off; their borders, less separated, are united by membranes in the midst of which are often found osseous plates, the rudiments of wormian bones, destined to become developed and to fill up the sutures if the disease is to terminate in a favourable manner.

The development of the cranium is very often irregular. Sometimes the distention is especially manifested on the vault of the cranium, sometimes on the contrary it is confined to the anterior or posterior part, or even to the sides of the head. If the diameters of this cavity are measured, sometimes four to six inches difference is observed between the fronto-mastoid diameter of one side and the same diameter taken on the opposide side.

The multiplicity of the alterations of the encephalon or of its envelopes is such that the pure and simple exposition of them must be traced without the consideration of their comparative frequency. The facts known up to the present time are not sufficiently numerous to justify this proceeding.

In some cases the liquid is found enclosed in the ventricles, and distends these to such an extent as to thin their walls and to compress

the brain against the upper walls of the cranium. From the greater or less quantity of the effusion results the flattening or the disappearance of the cerebral convolutions, the easy or difficult distinction of the grey and white portions, and lastly the preservation of the central parts of the brain. It may easily be conceived that a considerable effusion, situated in the ventricles, can transform the organ into a kind of membranous sac in which it would be impossible to recognize the texture of the encephalic pulp.

The corpus callosum is sometimes pushed up close to the cranium; the septum lucidum torn through; the corpora striata flattened; the optic thalami wasted; the nerves atrophied, softened, canaliculated, &c.

In other children, according to the observations of MM. Baron and Breschet, the liquid occupies the arachnoidean cavity. The brain does not exist or only exists in a rudimentary state. It consists of a small, shapeless, soft, greyish mass, placed in front of the annular protuberance. This part, the cerebellum and the spinal cord, are preserved. The nerves are atrophied, and issue from the mass which replaces the encephalon. Thus, the seat of the hydropsy being the same, there is only atrophy of the brain. It is sometimes more marked in one hemisphere than in that of the opposite side; but with regard to this, it is impossible to state anything precisely.

The meninges rarely present any alteration. No important modifications are observed on the dura mater. Breschet, however, has observed the absence of the falx cerebri. The arachnoid is of a whitish colour and sometimes infiltrated with an opaque serum. The pia mater is very thin, so much so, that it is said to have disappeared; but an attentive examination will always demonstrate its existence.

[The pia mater (and the arachnoid also must be here included) in chronic hydrocephalus is morbidly changed to such a degree that it clothes the cerebral ventricles as a thick, firm, opaque, scarcely tearable membrane. It is undoubtedly this serous membrane which is the originally diseased structure, producing the extensive effusion of serum, and moreover gradually becoming hypertrophied to a high degree. The other abnormal appearances met with in the brain, its inordinate distention, the almost membranous thinness of the cerebral matter around the ventricular cavities, as also the abnormalities of ossification and of the form of the skull, are undoubtedly but consequences of the primitive disorder of the pia mater.—Dr. Weber, *Op. Cit.*, p. 49.—P.H.B.]

The quantity of effused serum is very variable. From the usual quantity of eight ounces and one pint it sometimes amounts to five and ten pints. Some authors, Aurivill, Buttner, Cruikshank, speak of cases in which they found as much as eighteen, twenty, and even twenty-seven pints of fluid. But similar examples are necessarily very rare.

The chemical composition of the serum enclosed in the cranium has

been the subject of the researches of several very skilful chemists. The following are the results of the analysis of Barruel, published by Breschet. In 1000 parts he found

Water	9.900
Albumen	0.015
Osmazone.	0.005
Chloride of sodium	0.005
Phosphate of soda	0.005
Carbonate of soda	0.010

The analyses of Marcet, Bostock, Berzelius, and John agree very closely with the above.

Lastly, to terminate this chapter, we may mention the vices of conformation which frequently accompany congenital hydrocephalus. Thus, hare lip, cleft palate, opening at the back of the cranium, hydrorachis, club feet or hands, the incomplete development of the lungs, of the heart, and of some other viscera are the most common malformations which are met with in these circumstances.

Symptoms.

It is impossible to recognize chronic hydrocephalus as long as the child is enclosed in the mother's womb. We can at least only predict the existence of this disease when the woman has already given birth to one or several hydrocephalic children.

The increase of the volume of the head is the most important symptom of congenital chronic hydrocephalus; it is also the most easy to verify in the patients. If the head is not too much increased in size at the period of birth, the delivery terminates easily, and the disease, arrested for an instant, develops itself with renewed vigour. If, on the contrary, it possesses very considerable dimensions, it becomes an obstacle to parturition, and it is necessary to crush it with the cephalotribe.

Unfortunately, this external sign does not always exist. As has already been observed, there are cases in which the head preserves its normal dimensions, and even in some children it appears to be smaller than usual.

In these patients the head is pointed, flattened on the sides, and depressed at the frontal region; the sutures are ossified and the fontanelles closed previous to birth, which is rapidly followed by death.

The small number of those who escape, says M. Breschet, terminate their existence at the end of some weeks or of several months. They are deprived of the intellectual faculties, and their senses are obliterated. The do not see; their pupils are dilated and insensible to the action of light; their eyes are in a state of continual oscillation. They scarcely hear. Sensibility exists, but motion is difficult, the movements

of the limbs being nearly abolished. The functions are irregularly performed. The children eat with avidity, but they digest badly: their dejections are involuntary. Their respiration is well performed, but is easily embarrassed. Their intelligence is abolished; they do not observe exterior objects; they have convulsions or coma when they are moved or when the head is shaken, and die at last in the midst of these symptoms.

In congenital hydrocephalus, with increase in the size of the head, there is also deformity of this part. These modifications are never very considerable at the time of birth; they manifest themselves in the months which follow it.

The dimensions of the cranium gradually increase, by means of the separation of the sutures and by the projection outwards of the upper border of the frontal, occipital, and parietal bones. From this results an important modification of this part, which loses its proportions, and is no longer found in harmony with the face, the dimensions of which remain the same. It constitutes a true deformity, the remembrance of which can never be lost after having once met with it.

The senses develop themselves with difficulty, and are exposed to frequent aberrations.

The eyes oscillate incessantly, the pupils are very much dilated and slightly contracted; the impression of light is often painful; the sight is feeble, and is gradually lost.

The sense of smell is often abolished, and when it exists it is often perverted. Thus, children arrived at an age when they can give an account of their sensations, complain of disagreeable odours which do not strike those who surround them.

Hearing, very delicate in the first months of existence, becomes gradually more obscure and entirely disappears.

The intelligence is with difficulty developed; yet all those acts which relate to the instinct of individual conservation appear to be properly exercised. The child, still quite young, becomes habituated to his nurse and recognizes her. He tastes, and is sufficiently knowing to push away those articles of food which displease it on account of their bad quality.

Moreover, these modifications are in relation with the duration and intensity of the disease. The intelligence is sometimes abolished among children, who since then have no memory, and have not been able to learn to speak. Amongst others the speech is slow and nasal; they forget their words, and dwell over them a long time before pronouncing them. The voluntary movements are with difficulty developed; the limbs tremble and are usually not strong enough to sustain the body and to maintain it in equilibrium. The sitting position is possible at the commencement of the symptoms, but it soon becomes the cause of

serious nervous phenomena. The pressure of the liquid on the nerves at the base of the brain is the cause of it. It determines pains in the head, vertigo, nausea, or convulsions. The children must then be placed on the back or on the sides, and the head reclined on a cushion.

In those hydrocephalic patients who can walk about, the gait is uncertain and unsteady; they keep their feet close together, and seek on the ground a spot suitable to insure the conditions of the equilibrium of their body.

The animal functions are subject to the same disturbances as the functions of organic life, according to the degree of the anatomical alterations of the hydrocephalic patient. Digestion is usually well performed, but there are occasional vomitings, and nearly always constipation. At the end of the disease, the alvine dejections are involuntary; the respiration is never greatly disturbed, it is especially irregular and accompanied by a violent dyspnœa on the approach of a fatal termination.

The regularity of the beatings of the heart indicates that there is no obstacle in the movements of this organ. The pulse is normal; in some cases, in the midst of the nervous symptoms which the children present, it becomes small, sharp, sometimes intermittent, and remains thus in the last moments of existence.

Hydrocephalic patients have frequently nervous symptoms which result from compression of the brain by the effused fluid. Cephalalgia, vertigo, vomiting, of which some subjects complain, ought to be referred to this cause. It is the same with the convulsions which are observed in this disease, in consequence of a fit of anger or of spite. This symptom can also be produced at will by the agitation or by the slight compression of the head of the children. It is then followed by a more or less decided coma.

Progress—Termination.

Congenital chronic hydrocephalus generally leads to the death of the children shortly after their birth. Some resist, and vegetate for several years. J. Frank recounts, from various authors, many examples of hydrocephalic patients who have lived to the age of eighteen, twenty-five, thirty, forty-five, and even fifty-four, in this sad condition.

This prolongation of life depends solely on the nature of the alterations of the brain, and on the quantity of effused serum. There are some patients in whom the formation of the liquid is sufficiently slow so as not to constrain the liberty of motion, but which gradually becomes weakened. In others it is very rapid, and occasions sensorial and muscular disturbances, such as vertigo, convulsions, somnolence, coma, and paralysis of the limbs, precursory phenomena of death.

Confirmed hydrocephalus is beyond the resources of art; yet cases of cure are reported. In these cases the quantity of effused liquid was not very considerable, and there was probably no serious organic lesion of the brain, like those of which we have spoken.

[The following abstract, from the Report of the Registrar General, shows the deaths from hydrocephalus in 1845-9, and the deaths in each respective quarter of the year:

	1845.	1846.	1847.	1848.	1849.	Total of the quarters.
Quarter ending March . . .	460	488	440	390	380	2158
,, June . . .	456	443	407	405	383	2094
,, July . . .	421	448	415	351	393	2028
,, September .	386	342	408	342	314	1792
Total of the different years .	1733	1721	1670	1488	1470	

And of 825 males and 639 females who died from this disease in 1849, 735 males and 572 females were under five years of age.—P.H.B.]

Treatment.

Chronic hydrocephalus ought to be treated by means of remedies capable of preventing the formation of a fresh quantity of liquid, and of assisting the absorption of that which is already effused.

In order to bring about this double result, digitalis under all its forms, oxymel of squills, nitrate of potash, and all the diuretics; the purgatives, and especially calomel, so as to produce three or four stools a day; mercurial frictions to the neck, and especially to the head, &c., have been successively made use of.

Topical astringents to the head, such as bandages wetted with vinegar of squills, aromatic wine (Van Swiéten), or the essential oils, either ethereal or camphorated; plasters of soap and camphor are very useful in this disease, if only to procure comfort to the patient.

In those cases in which the phenomena of congestion, or of a determination of blood towards the head, are observed, leeches should be applied or cupping glasses to the back of the neck. To prevent the return of these symptoms, a blister may be put to the same region, or a seton, both of which should be strongly excited by an epispastic ointment.

If it is wished to act directly on the head, often repeated large flying blisters should be applied; and in some circumstances, cauteries. The first of these means is always preferable to the second.

Compression of the cranium has often been made use of. It should be made gently at first, and very methodically, by means of a leather cap, or rather with straps of diachylon plaster. This means is of no efficacy without it is employed for a long time. It may be attended with great danger if it is not cautiously applied. Its use is often followed by a considerable diminution in the dimensions of the head, and one can thus hope to impede the progress of the disease.

In several authenticated cases of subacute hydrocephalus, but in which the presence of a large serous effusion in the ventricles could not be proved, the patients have been cured by large doses of iodide of potassium.

Iodide of potassium	45 grains.
Distilled water	℥ xii.

One table spoonful of this solution is to be given to the children every hour.

[I have observed decided benefit result from the treatment by iodine. The external application of the compound iodine ointment should be combined with the internal administration of the iodide of potassium. Dr. Christie of Keith, and Dr. Woniger of Hamburgh, have published cases of successful employment of iodine in the treatment of acute hydrocephalus.—P.H.B.]

Several authors have recommended puncture of the cranium, so as to give issue to the cerebral fluid. This operation proposed by Hippocrates, Celsus, Monro, Lecat, Astley Cooper, and condemned by many celebrated surgeons, has been practised in this age amongst us by Dupuytren and Breschet. It has been constantly followed by unfavourable results. Death has been the consequence of it. This may be readily conceived, when the frequency and extent of the anatomical alterations of the brain of hydrocephalic patients are considered. It perhaps would be wiser to banish this operation from practice. Yet eminent medical men do not hesitate still to have recourse to it.

M. Schoepf Méreï has practised the puncture of the hydrocephalic cavity seven times, and that without any inconvenience in those cases in which the effusion took place, after symptoms of very short duration, in children whose cranial sutures were yet open, who were from three to six months old, and in whom, also, notwithstanding a large quantity of liquid, there were no symptoms of collapse or of cerebral softening. He repeated the operation once or several times in the same children, giving them, internally, iodide of potassium, or cod's liver oil, and externally, cold douches to the head, and keeping this part moderately tightened by a bandage. M. Schoepf Méreï states that he has thus saved two of his patients.

This operation consists in making a puncture, by means of a long and slender trocar, above the lateral part of the brain, corresponding to the lateral ventricle. The instrument is pushed forward until it has penetrated into the cavity of this ventricle. Sometimes one pound and a half of liquid passes through the canula.

As soon as the nervous symptoms and the convulsions make their appearance in children attacked with this disease, the therapeutical

agents of which we have spoken in the article devoted to convulsions should be administered.

[It would appear from the results of sixty-three cases operated on by different persons, eighteen, or two out of every seven, terminated favourably. No doubt this success has been overstated, and probably this unfavourable result is more due to the fact of the presence of the disease than to the operation itself, for children may suffer severe injuries to the brain, and yet survive.

Recovery of an infant after perforation of its cranium, is related by Dr. Lagre (*Revue Medico-Chirurg.;* tom. vi, p. 55). A feeble male infant, heaving some sighs, was delivered by the Cæsarean section, after vain endeavours to deliver by the forceps, after craniotomy. There was a large wound in the cranium, situated to the right of the sagittal suture, and a few lines in front of the posterior fontanelle. Through this the brain was visible, looking like a sanguinolent pulp, a small portion escaping by the wound, as did other portions, after the suppurative process was set up. The child recovered; compresses, dipped in cold water, being alone applied to the part. He is now nine years old; a loss of substance, equal to a florin in size, is still observable in its cranium, notwithstanding that reparation of the loss of the cranial bones occurs in the young. The child's intellectual faculties are in their normal state. A circumstance worthy of note is, that at the solution of continuity in the bone, when the soft parts alone cover the brain, there sometimes takes place a depression, and then the brain is plainly seen raised up by the arterial pulsations at the bottom of their cup-like depression. When this appearance manifests itself, experience has shown that the child is not well. At other times, the soft parts remain on a level with the cranial bones, and the arterial pulsations are slightly, if at all, observable.

Prof. Mende mentions the fact that a child may suffer a considerable loss of cerebral substance, and yet be born alive; whereas, continued pressure on the surface of the brain causes coma, asphyxia, or death. Dr. Beatty of Dublin, and others, have related cases where the crochet and perforation had been used, and yet the child cried loudly after delivery; and a case has been observed, in which a child, delivered by these instruments, lived three weeks after delivery, troubled, however, as the mother observed, with nine-day fits.—P.H.B.]

CHAPTER XVIII.

ON THE APOPLEXY OF NEW-BORN INFANTS.

Amongst children at the breast there are several diseases which may be described under the name of cerebral apoplexy. Thus, the apoplectic state of infants, a sort of passive cerebral congestion which seizes them at the moment of birth, the hæmorrhage of the meninges or of the brain during suckling should be included under this denomination.

Still it is necessary to distinguish clearly these morbid states which have nothing in common, and which develop themselves in special circumstances and at different ages.

The apoplectic state of infants manifests itself even at the moment of birth, under the influence of a difficult parturition, or of an unnatural position of the fœtus; this is what has been called the apparent death of infants. All that relates to this subject will be described in the chapter devoted to asphyxia.

Cerebral apoplexy and meningeal apoplexy develop themselves at a more advanced age, and under the influence of causes which are still unknown.

One is characterized by an active congestion of the encephalon, without internal hæmorrhage, and without effusion of blood into its envelopes.

The other only exists in the condition of cerebral hæmorrhage, either ventricular or meningeal.

The apoplectic state of infants, and the hæmorrhage of the meninges or of the brain, must then be described separately.

The Apoplectic State, or Cerebral Congestion of New-born Infants.

The apoplexy of infants is described, in connexion with asphyxia, by all writers on midwifery, under the name of apparent death, or the apoplectic or apoplectiform state. It will be described in the chapter devoted to asphyxia, and to which we may refer for fuller details.

The children have the skin, and particularly that of the face and head, quite cyanozed, of a livid red colour, interspersed with blue spots. The lips are violet, and pendant; the eyes closed; the beatings of the heart feeble; and respiration cannot establish itself.

If this condition is prolonged, death is the consequence. When it so happens that from the result of great and careful exertions, the respiration can be established, the livid colour of the skin is observed to disappear. It is replaced by a rose tint, at first manifested upon the lips and the face, before it becomes general. The heart beats with more force; its movements become regular and give more action to the respiratory forces; their life is saved if a relapse, caused by the cries of the child, does not renew the cerebral congestion, and again interrupt the action of the heart and of the lungs.

When the children die, the meninges are found very much congested, and the vessels of the pia mater enormously distended. Blood is sometimes effused in these membranes. The brain appears swollen, especially when the infiltration of blood into its parenchyma is great. If the organ is incised, the cut surfaces are covered by a multitude of small drops of blood, which soon unite together to form larger drops.

There are no lacerations of the tissue nor well-determined apoplectic spots.

All the soft parts of the head are gorged with blood. Of the viscera, the lungs are the only ones which present this alteration in a marked degree.

The apoplectic state, or the apoplectiform asphyxia of infants, is observed in cases of difficult parturition, when the head of the fœtus has remained a long time confined in the pelvis, and in a considerable state of flexion relatively to the rest of the body; in the cases of the twisting of the cord around the neck, at the moment of its compression by the head in the passage; and, lastly, in those cases where there is interruption to the placental circulation, which may happen in the labour when the placenta is attached to the neck of the uterus.

The apoplectic condition is very serious if it continues long. Life is soon extinguished. This happens when the cerebral compression, produced by the congestion of blood, occasions paralysis of the heart, and of the muscles of respiration.

The apoplectic condition of infants is allied to another form of asphyxia, which is observed at the moment of birth. These two conditions differ from each other in their exterior form, and are really only varieties of asphyxia. It appears to me convenient to describe them under the names of apoplectic asphyxia, and ordinary asphyxia.

In the ordinary asphyxia of infants, the child is pale, the lips are pendant and colourless, the skin dull, the limbs immoveable, the beatings of the heart nearly abolished, and there is no apparent respiration; the weakness is extreme, the anæmia general, and life cannot manifest itself, since the blood, which is its source, has not the vivifying qualities necessary to communicate to the brain that excitation which provokes the firm beating of the heart and the first respiratory movement.

On the contrary, life is extinguished amongst apoplectic children, not by a diminution but by an increase of the excitation of the brain. It is compressed in its action by the violent sanguineous congestion of the brain, the efforts of which are paralyzed.

To remedy the apoplectic state of children it is necessary to place the infant in the conditions favourable to the manifestations of its existence, to remove the compression of the brain and the engorgement of the lungs. The umbilical cord is to be left without a ligature so as to permit the flow of a certain quantity of blood; and if it is wanting, this evacuation is to be favoured by putting the child into tepid water. If in spite of these precautions the blood flows with difficulty from the cord, if one or two spoonfuls cannot escape from it, it becomes necessary to apply a leech behind each ear.

In this disease the various external excitants which can be advan-

tageously applied against the torpor of the children are made use of. For instance, applications of warm linen, exposure to a clear fire, tepid and aromatic baths, are proper remedies to stimulate the skin. Dry and aromatic frictions, slapping the buttocks, frictions on the chest concur to the same end and may facilitate the establishment of the circulation of the respiration.

Those agents capable of exciting the respiratory nerves must be also employed. Sprinkling the face with vinegar and water or with brandy, the stimulation of the nasal mucous membrane with vinegar, ether, and ammonia, the application to the nostrils of a small quantity of smoke from paper, all these means sometimes succeed in provoking efforts which lead to the infant making a respiratory movement.

The practice of pulmonary insufflation has also been recommended. This operation although very useful ought to be performed with some hesitation. There is no inconvenience in blowing into the mouth of infants, after having closed the nostrils by compressing them and alternately relaxing the thoracic walls.

It can also be done by taking the laryngeal tube and, with the view of sending a purer air into the lungs and practising the insufflation with a pair of bellows. Here, however, in remedying an already very serious disorder, another may be determined, which is emphysema of the lungs.

Galvanism, which has been proposed in these cases, has never been followed by very brilliant success. The wires should be placed on the muscles of respiration and especially on the diaphragm, which is the most powerful of all. They should then be placed in contact with the two poles of a moderately charged pile. This stimulus is sufficient in some children to establish respiration.

In the treatment of the apoplectic condition of infants an untiring perseverance must be adopted, and the long-continued employment of the means which have been pointed out as suitable. After numerous trials a favourable result is obtained which at first appeared hopeless. However, as this subject will be treated of more in detail in the paragraph devoted to the asphyxia of infants, I shall abstain from saying more at present.

CHAPTER XIX.

ON HÆMORRHAGE OF THE MENINGES, OR MENINGEAL APOPLEXY.

The term *meningeal apoplexy* is applied to the effusion of blood which is formed on either surface of the membranes which envelop the brain.

This disease is more common amongst children than in adults and the aged. It is especially observed amongst infants, and more rarely during the first years of life; this appears at least the result of the interesting researches of Dugés, of M. Cruveilhier, and of my colleague M. Legendre.

Causes.

Meningeal apoplexy often follows birth and the state of apparent death. It often manifests itself without an appreciable cause. It sometimes appears after a violent cerebral congestion, occasioned by an attack of anger, by exposure to the sun, &c. It is met with as often in summer as in winter. Amongst children, infancy appears to be a predisposition to its development. Thus nearly all the examples of this disease have been collected amongst children just born or from one to three years old. None of the patients cited by M. Legendre had exceeded this period of their existence.

Anatomical Lesions.

Meningeal hæmorrhage takes place almost invariably in the large cavity of the arachnoid; very seldom external to this serous membrane, whether on the side of the pia mater, or on the side of the dura mater, except in cases of fracture of the cranium. It is observed in the arachnoid which covers the ventricles; but its usual position is on the surface of the hemispheres. The hæmorrhage always covers the two hemispheres. There are few exceptions to this rule.

The effused blood presents very different characters according to the period of the disease in which its condition is studied. At the commencement the blood is fluid, but towards the fourth or fifth day it coagulates, the serum gradually disappears, and there remain clots of greater or less thickness which contract adhesions with the parietal serous layer, and which ultimately undergo important transformations.

These clots are quickly covered on both surfaces by a thin, smooth

membrane of a new formation. The superior layer, contiguous to the dura mater, easily recognizable early in the disease, gradually becomes thinned, and contracts intimate adhesions with the serous membrane which lines this meningeal covering. The inferior layer soon assumes the characters of a serous membrane; on the edge of the clot it becomes lost in the parietal layer of arachnoid, so as to lead to the belief in the existence of extra-arachnoidean hæmorrhage. M. Baillarger has demonstrated, by anatomical research, the falsity of this supposition. He has shown that it was always possible to isolate the clot, and to exhibit the parietal serous layer situated above it.

The clot, at first soft, becomes gradually firmer; it daily becomes diminished in size.

The interior is formed of fibrine of a blackish colour, which by degrees loses its colouring matter, and becomes of a pale red. The serum, which it encloses, is slowly absorbed. It then gradually diminishes in size, and passes at length to the condition of a whitish fibrinous layer, which sometimes presents the characters of fibrous tissue.

In some cases this clot entirely disappears, and there remains, between the two membranes which covered it, a space filled with a rose-coloured serum. These cysts, to which M. Legendre has called attention, are, according to him, one of the modes of the favourable termination of this disease. They are sometimes observed to acquire a very considerable development. They enclose from eleven to thirteen ounces of fluid, and constitute a new variety of hydrocephalus which had not previously been described.

Moreover, a real organization of the clots is found, which, after having lost a part of their volume, live at the expense of the tissues by means of vessels of a new formation developed in their interior.

At the same time a considerable congestion of the pia mater and of the encephalon is also observed. The ventricles are slightly dilated, enclose a small quantity of serum, which is limpid or of a yellowish colour, but always transparent.

In young children, the brain is not at all compressed by the effusion of blood. The bones of the cranium, not being united, separate and prevent the compression of the cerebral hemispheres. If the effusion was more frequently confined to a single hemisphere, the partial dilatation of the cranium might become an important sign in the diagnosis. It loses a great part of its value when it is known that the anatomical lesions usually exist on both sides of the brain.

Symptoms.

The symptoms of meningeal hæmorrhage in children at the breast

are very obscure, and may be entirely confounded with those of inflammation of the meninges or of the brain.

These are the terms in which M. Legendre describes them: "After one or two vomitings, or even without precursory vomiting, the children were seized with fever and with some convulsive movements, the most usual seat being the globes of the eyes, which leave behind as a consequence a slight strabismus; the appetite was lost, and thirst considerable; the evacuations were natural, or readily produced. Soon a permanent contraction of the feet and hands was observed, which was quickly followed by tonic or clonic convulsive attacks. During these convulsions, sensibility and consciousness were abolished, and the face, habitually injected, assumed a deeper tint.

"In the interval of these attacks, drowsiness was present, which, though slight during the first days, augmented in proportion as the disease made progress; the fever continued during the whole course of the disease, and became stronger in proportion as the fatal term approached. Then the convulsions, separated at first by longer or shorter intervals, grew more and more frequent, and became almost continuous in the last moments."

Death is often hastened by the appearance of intercurrent thoracic inflammations. If it were not for this complication, the disease might be cured, or pass into a chronic state. This is what has been observed in children attacked with arachnoidean hydrocephalus, who, several months before, had experienced all the symptoms of a meningeal hæmorrhage.

If the child escapes the first attacks, and the disease terminates by the formation of a cyst filled with serum, the quantity of which increases every day, the symptoms of chronic hydrocephalus are observed.

In conjunction with the nervous disorder, and the phenomena with which we are acquainted (See art. *Hydrocephalus*), the head assumes a peculiar form which is in relation with this variety of hydrocephalus. The deformity is not general. It takes place on one side or the other, according to the position of the cyst. By reflecting on the form of the head, and on the progress of the morbid phenomena, the nature of the disease may be determined.

[The venous plexus surrounding the coverings of the spinal marrow is often congested, and in some cases suffers rupture, consequently permitting extravasations to ensue. These, as in the case of those within the cavity of the cranium, are not unfrequently causes of the child not breathing, although born with a pulsating heart. The spinal cord suffering pressure cannot impart its influence to the periphery at the moment of birth. The amount of extravasation varies considerably. In one instance Dr. Weber saw the dura mater of the cord, from the atlas to the sacrum, covered, both on its posterior and anterior surfaces, with a thick layer of semi-coagulated blood; but he has never seen extravasation between

the periosteum and the bones, as occurs in the cranium. The cellular tissue between the posterior surface of the dura mater and the inner face of the vertebra is often the seat of effusions and exudations; one of the most important, and almost without exception, fatal forms of which consist in the true croupous exudations of this locality formed during the course of previous *meningitis spinalis.* These are not to be confounded with an adipose layer, sometimes found on the dura mater of the spinal cord of well nourished children. The signification of the capillary injection of the dura mater itself is indicated by the accompaniments of such injection; on the one hand they demonstrate its congestive, on the other its inflammatory character. In the pia mater, injection of its vessels, with exudation into the sac of the arachnoid, are found. Frequently the arachnoid bursts, the fluid effused into its sac is discharged, and the spinal cord, throughout its whole length, swims as it were in water. Softening of the spinal marrow is not uncommon, but true sclerosis of it Dr. Weber has never seen. Cruveilhier records a case of hæmorrhage covering a considerable part of the convex surface of the brain and even occupying the spinal cord.—*Anatomie Pathologique;* liv. xv, pl. 1.

Paralysis, which in the grown person is one of the most frequent results of the escape of blood from the cerebral vessels, is so rare in the child that it was observed by M. Legendre only in one out of nine cases (*Researches Anatomo-Pathologiques sur quelques Maladies de l'Enfance.* 8vo; Paris, 1846; p. 130) and by MM. Rilliet and Barthez (*Traité des Maladies des Enfants;* vol. ii) in one out of seventeen cases. This may doubtless be accounted for by the circumstance of the blood being almost always poured out into the cavity of the arachnoid, so that the pressure exerted by it on the brain is generally diffused over the surface of the organ, and is nowhere very considerable.

West is of opinion that there seems reason for supposing that the hæmorrhage is sometimes of a purely passive character, and dependent on an altered state of the blood. He relates two instances of this *cachectic form of cerebral hæmorrhage.*

In the first, a boy of five weeks old, of healthy parents, and perfectly well for the first fortnight after birth; he then, without any evident cause, grew drowsy, frequently vomited, and became jaundiced. The abdomen was hard and large, and he cried when pressure was made on the right hypochondrium. A leech applied on the right side drew a good deal of blood, and the hæmorrhage was stopped with difficulty; the bowels, previously constipated, were acted on with small doses of calomel and castor oil, and in three days the child lost the yellow tinge of his skin, became cheerful, and appeared much better. On July 18th he was suddenly seized with hurried respiration and great depression, soon followed by violent convulsions, during which he screamed aloud. At the same time it was observed that his left hand had begun to swell and to put on a livid hue, and on the 20th the right hand also became œdematous. His whole surface grew quite sallow, and, on the day before he died, the œdema of the left hand had much increased, the colour had become considerably deeper, and there were small spots of extravasated blood over each knuckle. The right elbow was slightly livid, the right hand much swollen, but of its natural colour, and a small black spot had appeared under the skin, corresponding to the knot of the cap string. The fits recurred very frequently, the child in the intervals lying quite still; the pupils were contracted, and the condition seemed to be one of extreme exhaustion rather than of coma. On the 20th the power of deglutition was lost, and after several returns of less violent convulsions, the child died at nine a.m. on July 21st, about sixty hours after the occurrence of the first fit.

The sinuses of the brain were full of fluid blood; a black coagulum, three or four lines thick, covered the whole posterior part of both hemispheres, extending from

the posterior third of the parietal bones, occupying the whole concha of the occipital bone, and reaching along the base of the skull to the foramen magnum. A little blood was likewise effused about the anterior part of the base of the brain, though the quantity was very small in comparison with what was found at its posterior part. The substance of the brain was very pale, and all the organs of the body were anæmic, except the liver, which was gorged with fluid blood, while the heart was quite empty. The ductus arteriosus was closed, the foramen ovale admitted a probe with ease, the ductus venosus admitted one with difficulty.

In the second instance the passive hæmorrhage took place into the arachnoid, in a child exhausted by long continued illness, all the effects of which were aggravated by poverty and want. From the age of two to that of five months the child had been subject to frequent attacks of hæmatemesis and purging of blood, and though his health afterwards improved, yet he never became strong, and his evacutions were almost always deficient in bile. After he was weaned he lost flesh and strength, in consequence of the coarse food given him, and at nearly three years old was puny and emaciated. Three days before his death an attack of diarrhœa came on, which induced great exhaustion, and while suffering from this affection he suddenly became comatose, cold and almost pulseless, and his breathing became so slow that he inspired only four or five times in a minute. In this state he lay twenty-four hours, and then died quietly. Nearly six ounces of dark coagulated blood were found in the sac of the arachnoid, over the right hemisphere of the brain ; a little blood was likewise effused beneath the arachnoid, and there was a very small clot in the lower and front part of the right middle lobe of the brain, but no ruptured vessels could be perceived. Great anæmia of every organ, and a state of extreme attenuation of the walls of the heart, were the only other remarkable appearances.—*Diseases of Infancy and Childhood ;* p. 42.—P.H.B.]

Progress—Duration—Terminations.

The invasion of the disease is sudden, and its duration is in relation with the quantity of blood effused. When the hæmorrhage is considerable, a speedy and fatal termination is the consequence. On the contrary, life is prolonged in the most favourable cases. The favourable termination of the disease is progressively effected to the entire disappearance of the clots, or to the formation of a cyst which may become the origin of an arachnoidean hydrocephalus.

Meningeal hæmorrhage is not such a frequent disease that one can yet establish in a precise manner, by clinical observation, what its termination is to be. It is almost invariably fatal, or else it passes to the chronic state. There are, as yet, very few well authenticated examples of cure. All the patients, seven in number, which fell under the observation of M. Legendre, died, but many perished in consequence of acute diseases of the chest. Cure does not appear to me impossible, if the hæmorrhage is inconsiderable, and formed by a small portion of clot mixed with serum.

Diagnosis.

This disease may be easily confounded, at its commencement, with another affection of the meninges—tubercular meningitis, for example.

The sudden invasion of meningeal hæmorrhage, however, will serve to distinguish them from each other. It is known that this is not usually the case in granular meningitis, which succeeds a stage of very evident premonitory symptoms *(stage of incubation)*. Besides, in meningeal hæmorrhage the vomitings are not constant, and constipation does not exist, while it is obstinate in granular meningitis.

Treatment.

The object of the treatment is, amongst these children, at the commencement of the disease, to divert the flow of blood, which is the cause of the hæmorrhage, from the brain. The application of two leeches behind the ears, once or several times repeated, according to the strength of the patients; bleeding from the arm; the employment of dry cupping on the back and on the chest, may usefully concur to this result.

Direct refrigerants on the head may also be made use of; but they must only be employed with those precautions of which we have spoken in the chapter on meningitis.

The bowels should also be kept freely open by mild purgatives; the syrup of peach flowers, the syrup of chicory, calomel, &c.: medicines, the revulsive action of which, may oppose the progressive advance of the symptoms.

BOOK III.

ON DISEASES OF THE NOSE.

ON CORYZA.

The term *coryza* is applied to inflammation of the mucous membrane of the nasal fossæ. There are different kinds of coryza. 1st, acute inflammatory coryza. 2nd, pseudo-membranous inflammatory coryza. 3rd, chronic coryza and syphilitic coryza.

The anatomical alterations of this disease are, for inflammatory coryza, redness, swelling, and a diminution in the consistence of the tissue of the membrane which covers the nasal fossæ. It is not necessary that the swelling should be very considerable in order to obstruct the cavity of the nose, which, as is known, is very small in young children.

In the pseudo-membranous coryza, membranous concretions are found here and there of greater or less extent, sometimes isolated from one another. They present the usual characters of plastic exudations. The mucous membrane which they cover is always swollen, of a vivid red, and bleeding in certain points. Very commonly the false membranes are not situated in the interior of the nasal fossæ but only at the orifice of the nostrils. The obstacle which they offer to the exercise of the respiratory functions is the same, but it is more easily overcome.

In chronic coryza, the mucous membrane is pale, thickened in several places and covered with incrustations more or less thick and dry. These crusts are especially observed at the entrance of the nostrils. There they are reddish, formed by coagulated blood; they renew themselves frequently, for the child incessantly picks them off.

Coryza, which is always a slight disease in the adult, may become a very dangerous one in children at the breast. Billard and M. Rayer have, amongst the first, faithfully traced the history of this disease.

This disease results from the action of cold, from the damp air and the chilling of the extremities by the urine of children, if the frequent changing of them is neglected. It is produced by the exposure to the heat of too strong a fire or to the action of the sun, and by sudden variations of temperature, at the time of the changes of the season.

The child often sneezes and ejects by the nostrils mucous threads, at first clear, afterwards yellow, greenish, and purulent. The nose is red and swollen; it sleeps with the mouth open, breathes clamorously, with difficulty, and when the obstacle is considerable, finds itself unable to suck. As often as it is presented to the breast, it wishes to suck and cannot succeed, for suction is impossible, of which any one may convince himself by imitating this act after having pinched the nose. The child withdraws itself in despair, uttering violent cries, and expressing by the gestures and by the movements of the face the deprivation and the pain which it experiences. Soon pressed by hunger, and in the impossibility of satisfying it, the child becomes more and more disturbed, and dies of fatigue, pain, and inanition, if it cannot be made to respire through the nostrils. In the mean time it is necessary to feed it by the spoon.

This is obviously a very anxious position. It compromises the life of the child, which runs the risk of dying of hunger if it is very young. A young infant may perish from a coryza in four or five days. This disease is much less serious in older children. It is only dangerous when there is a difficulty in the exercise of respiration and of suction. Inflammation of the pituitary membrane

may, however, sometimes extend itself to the membranes of the brain and occasion an acute hydrocephalus, of which Billard has reported an example.

Coryza is rather common amongst those young children subject to colds. It is usually not serious. The same is the case with the coryza which precedes certain eruptive fevers, and especially measles. The pseudo-membranous coryza and the chronic coryza are, on the contrary, very serious diseases.

The nostrils should be relieved of the mucosities and incrustations which close them up, by lotions of marshmallow, linseed, of elder flower, or of milk obtained from the breast of the mother or of the nurse. In the pseudo-membranous coryza, injections should be made with a glass syringe of a solution of nitrate of silver, 1½ grains to 1 oz. of distilled water; or of sulphate of copper, 4½ grains to ℥ j of water; or of sulphate of zinc in the same quantity. It is much better, however, to touch the orifice of the nostrils very lightly with a stick of nitrate of silver, and afterwards to inject a little tepid water.

In chronic coryza, the same means should be made use of, and to them may be added, when that is possible, insufflations of alum.

Alum	60 grains.
Powdered sugar	120 grains.

Or those which I prefer, of which calomel forms the base:

Calomel	60 grains.
Powdered sugar	30 grains.

Lastly, if the nasal obstruction is such that it entirely prevents respiration and suction, the physician should attempt the introduction of a small silver tube into each nostril; it should be flattened, and curved from before backwards following the course of the floor of the fossæ, and afterwards fixed under the nose with the neighbouring tube. These two provisionary canulæ allow the passage of air, and prevent the child from dying at once, by giving the disease time to cure itself.

In syphilitic coryza the same symptoms are observed; its nature only is different, and it requires a special treatment. It will be described further on in speaking of the syphilis of infants.

APHORISMS.

147. Nasal snuffling is the symptom of severe acute and chronic coryza.

148. The coryza of infants, which produces obstruction of the nasal fossæ, is often fatal, in consequence of the obstacle it offers to sucking.

149. Syphilitic coryza is the most formidable of the varieties of coryza; but, however, it is cured more easily than the others.

BOOK IV.

DISEASES OF THE LARYNX.

The diseases of the larynx in children at the breast are always very serious. The slightest alteration of this organ occasions its narrowing, and as it is already very narrow, life may be rapidly compromised.

Simple or erythematous laryngitis, œdematous laryngitis, membranous laryngitis or croup, stridulous laryngitis or false croup, form the different varieties of the inflammation, of which the mucous membrane of the larynx may be the seat.

The first is a disease of slight importance, is accompanied by fever, and is characterized by a rather frequent cough, hoarse and without hoop. Its termination is always favourable. All that is necessary is to keep the patients warm and to give them demulcent drinks.

The second variety is very rare; some examples of it are given by Billard. It is an œdema of the glottis, a very serious disease, and nearly always fatal. It begins, like a simple cold, by a slight cough, which becomes stridulous, and by a considerable obstruction of the respiration. From this a state of asphyxia results, which necessitates the operation of tracheotomy.

Croup and false croup form the two latter varieties. We shall consider them more in detail.

CHAPTER I.

ON CROUP.

The name of *croup* is given to that disease of the larynx in which the inflamed mucous membrane is covered by a fibrinous layer of new formation, which is called false membrane.

Causes.

Croup is a much more frequent disease in cold and humid countries than in those of temperate climate; it is a disease which especially attacks the population of the north of Europe. It develops itself particularly amongst children, and more frequently in boys than in girls. It is observed amongst new-born children and in children at the breast. Billard, Dewees, M. Trousseau, have reported instances

of this. I have met with this disease in a child eight days old. M. Scoutteten has seen it in his daughter, six weeks old. It is, nevertheless, more frequent in the period of life comprised between two and eight or ten years.

If croup should be considered as a disease of infancy, it must not be concluded that adults are exempt from it. It has been met with in persons from eighteen to twenty years, and even amongst old people in their seventy-second year. M. Trousseau has likewise observed it in persons much advanced in life. He has even, in a case of this disease, practised tracheotomy on a woman who had attained her fortieth year.

Croup usually attacks the same individual but once, yet Howe, Vieusseux, Albers, Jurine, report remarkable instances of recurrence. M. Paul Guersant has seen a very remarkable example of it, he has even operated twice in the same child in an interval of two years.

Croup is an epidemic disease. This characteristic is a difficult one to establish at Paris, where most of the cases are disseminated and lost as regards each medical man who is limited to a portion of the field of public health. There, there is no general epidemic; only partial epidemics are observed developed in a quarter, in a house, or in a hospital devoted to infants. Still more must these epidemics be declared very unfrequent, for only one has been observed at the hospital for children at Paris, and that was not well characterized. The epidemic character especially reveals itself in limited localities. It is impossible to mistake it when it is observed in a province and in districts where nothing is ignored, and where the ravages caused by this disease in the population can be closely followed.

Croup, then, is an epidemic disease. It much more frequently appears in a sporadic state; and it is thus that it is generally observed at Paris. Its contagious nature is far from being demonstrated; still, this question must not be answered in the negative, for croup often follows pseudo-membranous angina. Now, the contagion of this latter disease has been demonstrated in the most positive manner by the observations of MM. Bretonneau and Trousseau.* It is, then, possible that croup, which, by its nature, very much resembles pseudo-membranous angina, may, like it, be transmitted by contagion. I say possible, for in the present state of science, a more positive expression cannot be made use of. It is, consequently, proper to separate those children labouring under croup, from other children whose health has not, as yet, experienced any attack.

[The evidence of the epidemic nature of croup collected by Valleix, Berge, Fleury, Canstatt, Wunderlich determines the point most satisfactorily in the

* Bretonneau, *Recherches sur l'inflammation spéciale du tissu muqueux, et en particulier sur la diphthérite.* Paris, 1826.

affirmative. One of the most decisive epidemics on record is that related by Terrand (*De l'Angine Memb. Thèse;* Paris, 1827): in a neighbourhood of very small extent, no less than sixty cases of croup, all of which were fatal, occurred in six months. A remarkable epidemic, extending over the greater part of central Europe, occurred in the years 1805-6-7. Guersant and others strongly maintain the contagious nature of croup, but its epidemic tendency serves to explain why instances of apparent contagion have been observed.— P.H.B.]

Anatomical Pathology.

The presence of a false membrane on the surface of the mucous membrane of the larynx is the fundamental anatomical character. Without this new formation, croup does not exist.

The false membranes appear under the form of thin elastic layers of a whitish grey colour, and rather tough. They adhere with more or less tenacity to the mucous membrane; they are exclusively composed of fibrine; their form and extent are variable. They occupy, in some patients, the tonsils and the superior part of the larynx, without penetrating into its interior. In others, this organ is attacked at the same time. Sometimes they only exist in the larynx, and in a small number of children they extend themselves to the trachea and in the bronchi, even to the smallest divisions.

They form, in the mouth, patches of a greater or less extent; they often enclose the epiglottis—like the finger in a glove. In the larynx, in the trachea, and in the bronchi, they form tubes which it is possible to raise entire. I have collected several of these false membranes: their dimension exactly corresponds to that of the cavities which enclosed them. Those which occupy the bronchi, represent, in a perfect manner, all the divisions of these tubes. Some are met with which are divided, to an infinite extent, like the bronchial tubes, and which form an exceedingly delicate tail, of very remarkable appearance.

Their superior surface is smooth, and covered with plastic mucosities. Their inferior surface, which corresponds to the mucous membrane, is uneven, and sprinkled with very numerous red points, which have been very well described by M. Blache in his memoir on croup.

These false membranes are quite insoluble in cold water, and even in warm water. Sulphuric, nitric, and hydrochloric acids, harden, contract, and detach these productions. Liquid ammonia, and alkaline solutions, dissolve them, and convert them into a transparent and diffluent mucus. It is important to remember these characters, which will find their application in the treatment of the disease.

The mucous membrane is thickened, sometimes slightly softened; its epithelium has disappeared; its surface is uneven, eroded, and covered with reddish dots, which correspond with the red spots situated on the inferior surface of the false membranes.

[Most of the higher British authorities support the doctrine that the general form

of croup met with is the rare exceptional form of M. Bouchut and his compatriots. The existence of the diptheritic form is not only admitted by us but is known to be very prevalent under particular circumstances; but it is a primary, idiopathic affection of the parts beneath the glottis, and not of the fauces, that most practitioners here consider the more general malady. Dr. Willshire (*British and Foreign Med. Chir. Rev.*; July, 1853) alludes to the fact of the above variance of opinion having its origin in the prevalence of certain geognostic, endemic, and epidemic influences, in either climate, which are sufficient to stamp the malady we both call croup with particular characters.—P.H.B.]

Symptoms.

Croup presents in its progress three stages, which it is nearly always possible to distinguish.

1st Stage. This stage is very difficult to recognize among children at the breast. Thus, the shivering and the uneasiness which are observed in children, pass by unperceived amongst infants.

In default of these symptoms, there are others more important, the study of which should not be neglected. The young children who are attacked by this disease are restless, have slight fever, and pain in the throat; their voice is hoarse, and they cough continually.

The cough and the hoarseness are two very important signs. As soon as they are observed, the back of the mouth should be examined; the pharynx presents a more or less intense redness, and on the tonsils false membranes are observed already formed. Sometimes there is remarked at this epoch, an abundant nasal flux, and false membranes in the nostrils. When a wound exists on the body, a blister for example, its surface is often covered by a production of the same nature. It is sometimes difficult to establish this stage, for the parents do not always perceive the commencement of the symptoms, and they hesitate when they are interrogated on this point. It usually lasts from four to five days, but this estimation is not at all a certain one. There are cases in which it has not lasted twenty-four hours.

[Prof. Gölis (*De rite cognoscendâ et sanandâ anginâ membranaceâ*) relates the case of a little boy four years old, previously in good health, who having passed from an overheated room into the open air, during extremely cold weather, was seized while walking with all the symptoms of most violent croup, which proved fatal in fourteen hours; and West refers to a case of a child seven years old who went to bed apparently well at eight o'clock, two hours afterwards began to breathe with the peculiar noise characteristic of croup, and presented all the symptoms of the disease before midnight.—P.H.B.]

2nd Stage. The symptoms of the second stage are—increase of the fever and general disturbance of the economy; dry cough, coming on by slight fits at first, afterwards by excessively painful attacks, followed by efforts of vomiting, and even by the rejection of matters in which false membranes are observed; hoarse and hissing ringing cough,

loss and hoarseness of the voice, difficulty of respiration, and more or less profound anxiety.

The cough presents characters which deserve to be studied in a special manner. It is hoarse, dull, and followed by a peculiar ringing, as if metallic. Its tone is very extraordinary, and resembles somewhat the noise that young cocks make when they attempt to crow. Much more frequently the cough is hoarse like the voice, and, often like it, it is smothered or extinguished.

When the cough is accompanied by expectoration, which does not take place amongst young children, or when it is followed by vomitings, the rejected matters should be examined. False membranes may be met with, the form of which may be useful to consult when it is necessary to establish the seat of croup. Thus, when tubular false membranes are found, the situation of their formation is judged of by their calibre. The membranous tubes of the trachea, and those of the second, third, and fourth orders of bronchial divisions, are very readily recognized.

The respiration is then more frequent than in the normal state; mucous and sibilant rales are heard in the chest; these are the only phenomena of auscultation observed at this stage. The disorder of the respiratory functions is especially external. It is revealed by dyspnœa, dull colour of the face, anxiety of the countenance, and by the gestures and attitude of the child.

The skin of the face is pale, and at the lower parts it is of a very slight bluish tint; the eyes are injected, the lips of a reddish brown colour, which indicates the venous congestion of the head. The dyspnœa comes on by fits, often after an effort of coughing; great anxiety is depicted on the face; the child makes gestures expressive of a wish to be placed sitting up, a posture which when its strength permits it hastily assumes; suffocation threatens it for a moment; then these symptoms disappear, and quietude is quickly restored.

This stage is in general short, and lasts from twenty-four hours to two or three days. Then, what is termed the third stage of croup, comes on, a period of struggle against the asphyxia which threatens, and which will probably triumph.

3rd Stage. In the third stage, the cough and the voice are quite extinguished; the respiration is accompanied by very loud hissing, which may be heard some distance off; it is very laboured, for all the inspiratory muscles are in play; thus, the muscles of the nose, neck, abdomen, and diaphragm, contract with energy; the child appears exhausted; the face is bluish, the eyes brilliant, the pupils contracted, the orbits excavated, the lips cyanozed, and the head remains thrown back. This state of depression, however, is

disturbed by violent fits of suffocation. In the midst of repose, after an attack of cough, the respiration becomes embarrassed, the face assumes a blue tint, the look disturbed and suppliant, and the child raises itself with an effort, carrying its hands to its neck, previous to falling into the arms of those who surround it.

If the termination of the disease is to be favourable, the symptoms gradually lose their intensity. A progressive decrease is observed in the preceding symptoms; the respiration becomes more easy, hissing no longer accompanies the inspiratory movements. The fits of suffocation disappear. The cough becomes less frequent, more moist, and loses by little and little the hoarse character which it presented. However, this modification, as well as the alteration of the voice, still persists a long time after the cure of the disease. As soon as the respiratory functions are reëstablished, the circulation becomes regular, the pulse assumes its ordinary characters, and the skin of the face and the rest of the body its natural white colour.

Progress.

The progress of croup may be estimated by the type above indicated. The disease commences at the back of the throat, before it extends itself to the larynx and bronchi; it is a true pseudo-membranous angina which becomes transformed into croup. When care is taken to examine the children at the commencement of the disease, we shall find this to be always the case. Nevertheless, some accurately observed but very rare facts demonstrate that croup may originate in the larynx and in the bronchi. In these instances, the first stage, such as we have described it, is entirely wanting, and disturbances of the respiratory functions first signalize the existence of the disease.

Croup, then, usually presents three stages, when the disease begins in the back of the throat and extends itself to the respiratory tube. It only presents two when it primarily commences in the larynx and bronchi.

It would be a mistake to believe that false membranes must be absolutely established in the whole continuity of the respiratory tube. Happily it is not thus. These accidental productions, primarily developed in the mouth, are always formed on the epiglottis and on the edges of the opening of the larynx, but they may fortunately not extend lower down. The disease is then much less serious. Its symptoms are otherwise the same as in those cases where the extent of the false membranes is much more considerable, even when they penetrate into the bronchial tubes.

The progress of croup is nearly always regular; the symptoms usually succeed each other in the order which has been indicated; still there are sometimes well marked remissions. They are observed

towards the end of the second stage. It may happen at the moment when the efforts of coughing and vomiting eject a large portion of the plastic concretions which obstructed the larynx. Then quietude is restored, but it is not of long duration. The false membranes form again, more delicate, it is true, than the first, and the symptoms of dyspnœa are developed afresh. Thus in some children two or three remissions of this kind are observed, produced by the detachment of false membranes, which are soon replaced by others.

Some authors have undoubtedly been mistaken concerning these remissions, for some of them, Jurine amongst the number, have described intermitting croup. I am of opinion that croup with false membranes cannot be considered as an intermitting disease. From the period that these concretions have become developed a certain number of symptoms appear, which are under their influence and last as long as they do. The only kind of croup that can be considered intermitting is that without false membranes—false croup or stridulous laryngitis. This is truly intermitting; it returns in well characterized fits, as will be described further on; so that when there is a complete intermission in the symptoms there cannot be true pseudo-membranous croup.

Complications.

Croup is nearly always complicated with pseudo-membranous angina; it commences with it, as we may be assured by examining the back of the throat at the commencement of the disease. This complication rapidly disappears, the false membranes of the mouth become detached, and if the children are examined when the disease has been established for several days the buccal mucous membrane may appear quite healthy. Then it may be conceived that the croup has commenced in the larynx. This probably would not have been the case if the mouth had been examined from the first day of the appearance of the symptoms.

Pseudo-membranous coryza sometimes coincides with croup, and forms a most important complication amongst children at the breast. It must be treated by the most energetic means. The children can neither suck nor drink, for while they suck either from the breast or from the bottle, they respire by the nose, and in this case this part is obstructed by false membranes. On the children attempting to suck they become suffocated, and are obliged to abandon the breast in order to breathe freely.

Inflammation of the œsophagus and pseudo-membranous gastritis are sometimes observed, but these complications are very rare.

The most frequent and the most dangerous complication of the disease which we are now considering is lobular pneumonia. This observation of MM. Blache, Guersant, and Trousseau, has been confirmed by all those

medical men who have studied croup. The pneumonia, primarily in the state of bronchitis in the first stage, only assumes the character of pneumonia towards the end of the second; it almost invariably leads to a fatal termination.

Descrete lobular pneumonia and confluent pneumonia are met with. In some children they exist concurrently with a pseudo-membranous capillary bronchitis. In these cases the disease is beyond all the resources of medicine.

Croup has been sometimes observed in connection with hooping cough, phthisis, eruptive fevers, &c. Amongst these diseases there is only scarlet fever which has a direct relation with that which we are now considering. It is, as is known, very often accompanied by pseudo-membranous angina; then the manifestation of croup is very much to be dreaded.

Diagnosis.

The diagnosis of croup sometimes presents difficulties, for there are other diseases of the larynx which are accompanied by symptoms very like those which it presents.

In simple laryngitis the cough and cry are hoarse, but the rough, smothered, hissing, ringing cough of croup is not observed; the respiration is not accelerated, and there are no fits of suffocation as in this disease.

The symptoms of œdematous laryngitis, or of œdema of the glottis, much more resemble those of croup. The cough is equally rough and hissing, the respiration is laborious, and suffocation imminent, but the fundamental character of croup does not exist. There is no expectoration of false membranes. This product does not exist at the back of the mouth. However, as it is not always possible to be assured of its existence it is easy to make a mistake, and there is a liability of mistaking one of these diseases for the other. The progress of the symptoms must also be taken into account. It is much more rapid in œdema of the glottis than croup. But after all there is little chance of error, for, as we have observed, œdema of the glottis is a very uncommon disease amongst young children. The mistake can never be prejudicial, the treatment in both cases is alike; there is only one resource against asphyxia, which is the opening of the trachea.

It is much more difficult to distinguish croup from pseudo-membranous tracheitis. The anatomical character is the same; there may be in both cases expectoration of false membranes; but, as M. Guersant has remarked, the symptoms which are observed in these two conditions are essentially distinct. "The pseudo-membranous tracheitis presents none of the symptoms of the first stage of croup; it commences by a more or less intense fever and a dry acute cough,

which causes a more or less tearing pain; the voice is low, but it is not extinguished as in croup; the respiration is not hissing; it is evident that the larynx is free. In the second stage the cough has become more moist; the respiration, although obstructed and rattling after the fits of coughing and between the fits, presents nothing to be compared to the dry and metallic rales of croup, and to the fits of croupal suffocation. In the third stage of this disease the obstruction increases, and after strong fits of coughing the patients reject membranous, riband-like layers of various dimensions. They then become convulsed, if in the meantime an attack of bronchitis or pneumonia does not cause a prolongation of the symptoms."*

The disease which has been most frequently confounded with croup, and which has been the cause of fatal mistakes, is false croup or stridulous laryngitis. It is important that a precise distinction be established between these two diseases which require entirely different therapeutical means. M. Guersant has contributed more than any one to clear up this subject, which so long remained confused and obscure.

Like croup, stridulous laryngitis is accompanied by a dry, hoarse, hissing more or less sonorous cough. The obstruction to respiration is extreme; it seems as if the child must perish of suffocation; yet the larynx is free, and there can be no expectoration of false membranes. The phenomena which are observed are entirely nervous; they are soon quieted; their progress is quite peculiar. They suddenly appear in a very high degree of intensity in subjects otherwise in a good state of health or labouring under slight cold. They come on in the middle of the night. The attack lasts about two hours, and reappears the following nights for two or three times; but it is more feeble and disappears.

Croup presents nothing like this. The symptoms gradually increase in intensity and it is at the end of several days that suffocation comes on. The fits appear during the day as well as by night; they reappear as long as the false membranes enclosed in the larynx have not been ejected. Far from diminishing in intensity they become on the contrary more terrible each minute, and terminate by carrying off the patient.

There exists, as has been observed, a very great analogy between the manifestation of these two diseases, between the cough, the dyspnœa, and the suffocation; but the similitude is only apparent. When the progress of these symptoms is carefully observed, this changes their character and necessarily modifies the interpretation which may be drawn from it. This progress is so different that it appears to me difficult henceforth to confound croup with false croup, pseudo-membranous laryngitis with stridulous laryngitis.

* *Dict. de Méd.*; t. ix.

Prognosis.

Croup is a very serious disease which always threatens life. It is a disease which it is difficult to overcome and to arrest in its progress. It is very often fatal.

Some differences must however be established, according to the seat and extent of the alterations. When the false membranes developed in the mouth only exist on the epiglottis and the superior opening of the larynx, the disease may be cured by means of appropriate treatment. The same is also the case when they do not extend beyond the limits of the larynx. But if these products penetrate into the trachea and bronchi, the croup is almost invariably fatal.

The complications of this disease add still further to the unfavourableness of the prognosis. Pseudo-membranous coryza in children at the breast is a most serious symptom, as has been already observed, since it exposes them to death from inanition. Lobular pneumonia increases the dyspnœa, and if the obstruction of the larynx is not of such a nature as to produce fits of suffocation, the difficulty of breathing which accompanies pulmonary inflammation very readily provokes them. In this case, if the child does not perish by the larynx, it will succumb in consequence of the disease of the lungs.

[The following abstract from the Report of the Registrar General shows the number of deaths from croup in London during the years 1845-49, and the number in each quarter.

	1845.	1846.	1847.	1848.	1849.	Total of the quarter.
Quarter ending March . . .	112	79	67	90	77	425
,, June . . .	83	67	50	80	91	371
,, September .	75	66	62	63	76	342
,, December .	82	65	116	62	80	405
Total in the different years .	352	277	295	295	324	

P.H.B.]

Treatment.

The treatment of croup has been advantageously modified in this age in consequence of the researches of two eminent physicians, MM. Bretonneau and Trousseau. It is composed of two parts, one medical, the other surgical. Formerly the first was the only one in favour; the second is now definitely accepted. We owe it to the two above-named physicians.

Abstractions of blood, revulsions, alteratives, emetics, and sternutatories form the basis of the medical treatment. Topical applications and tracheotomy belong to the surgical part of the cure.

Before the examination of the value of these various means it will be useful to understand what aim it is proposed to fulfil in making use of them. The knowledge of indications forms the basis of therapeutics, which, without it, is only a blind and dangerous empiricism.

The inflammation of the mucous membrane of the larynx must be moderated and the specific nature of this inflammation destroyed by abstractions of blood, by revulsives, and by alteratives. Tartar emetic, employed as an emetic, equally conduces to this result; but it possesses, like the sternutatories, a different action. It acts in a mechanical manner, and by the efforts which it occasions it provokes the expulsion of the false membranes which obstruct respiration.

It is by means of topical applications that we hope to favour the detachment of the false membranes, and when we cannot succeed, and suffocation is imminent, tracheotomy then finds its application. It is a desperate remedy, by means of which the lives of the little patients are momentarily saved, before their definitive cure is realized.

Abstractions of blood. There was a time when it was thought that the specific inflammation, which existed in croup, could not be better treated than by means of bleeding. Experience has singularly demonstrated the incorrectness of this idea. Bleeding does not succeed in this case as in the usual inflammations. It is only useful amongst strong and vigorous children, when the reaction is very intense, and when from the commencement the respiration is observed to be so obstructed that suffocation is imminent. It is in general dangerous in children at the breast, who are far from having the same strength of constitution. However, if it is thought necessary to have recourse to this means, it is preferable to employ bleeding from the arm to local abstraction of blood. This last method possesses the very great inconvenience of exciting the little patients who are frightened by the leeches, and who agitate themselves in a way which is prejudicial to them. The internal spasm, to which they are a prey, impedes the exercise of respiratory functions, and determines asphyxia more rapidly. Then, in order to apply them, the children must be made to lie on the back, with the head thrown backwards, a position which of itself alone is sufficient to occasion suffocation. Lastly, the neck is that region of the body of the child where it is most difficult to stop the flow from the leech bites. They cannot be compressed in this disease without the danger of still more obstructing the entrance of air into the chest. The leech bites then bleed abundantly; thence results a very serious anæmic condition, and sometimes even syncope, followed by death.

The greatest caution should then be used in the employment of abstraction of blood in children at the breast attacked with croup. Bleeding from the arm is preferable to the bleeding by leeches. If, however, this latter means be decided on, care should be taken to proportion the loss of blood to the strength and age of the patients. Three or four leeches ought to suffice; it is much better to repeat them than to put life in danger by too extensive an application.

Revulsives. The employment of blisters to the neck, and to different parts of the body, is not followed by that advantage which might be expected from them. Besides the uncertainty of their action, they are likely to give rise to serious danger. The wound which they cause is often covered by a false membrane, similar to that of the larynx, which may extend itself very far. This constitutes a second very dangerous disease, which it is necessary to attend to. Now, as the utility of blisters cannot compensate for such an inconvenience, it is, in my opinion, best to banish them from the treatment of croup. They may be of service in the exceptional cases, pneumonia for example; but they would then be employed less against the affection of the larynx than against the complication. We shall return to this subject further on.

Alteratives. Alterative treatment has been employed with the object of modifying the organism, and, at the same time, the nature of the diphtheritic inflammation. M. Bretonneau has sanctioned the employment of this method by numerous cases, and since, MM. Trousseau, Guersant, Blache, and the greater number of physicians have derived great advantage from it.

Mercury, sulphuret of potassium, and sulphate of copper, have been successively employed. The first of these medicines is the most useful of all.

Mercurial frictions upon the superior part of the chest, the axillæ, the internal surface of the arms and thighs, and calomel internally, are usually prescribed. The friction should be performed night and morning, and calomel should be given to children at the breast, in the doses of from three quarters, or one and half, to three grains a day.

This medicine favours the expectoration and detachment of the false membranes. The cough diminishes, and loses its special character in proportion as the difficulty of the respiration ceases.

In those children submitted to this plan of treatment, numerous stools are remarked, and a congestion of the gums which is salutary when not carried too far. When the alvine evacuations are too considerable, the use of mercurials must be stopped, in order that the patient may not be thrown into a too decided state of weakness. Salivation is difficult to bring on in children at the breast. When it exists, we may judge that the mercurialization is very intense, and the use of the medicines must be interrupted, that we may not witness those serious results, such as gangrene of the mouth and necrosis of the maxillary bones, accidents which have been observed by M. Bretonneau.

The internal administration of sulphuret of potassium has also been recommended in the dose of from nine to eleven grains a day, in a demulcent draught, and of sulphate of copper, in the dose of three grains

in two doses, at an interval of ten minutes, in a spoonful of gum syrup; but these are means the efficacy of which requires to be established by fresh observations. I shall devote no more time to their consideration, for it is useless to vary the treatment much, unless we can substitute more advantageous remedies for those already recognized as beneficial. Mercury is the best alterative with which we are acquainted, and it is impossible to replace it.

Emetics. The treatment by emetics favours the rejection of false membranes about to become detached, and assists in the expulsion of the mucosities which fill the larynx. It is the most useful that can be employed in the treatment of croup. Besides, one of the substances which is generally administered, tartar emetic, produces a double effect. It acts as a mechanical means, as we have just observed, it also possesses a very decided alterative action; it modifies the nature of the blood, and determines the softening and the detachment of the false membranes.

The emetics which may be given to children attacked with croup are ipecacuanha and tartar emetic. The latter deserves more confidence than the former. Ipecacuanha is given to children at the breast in the dose of four or five grains, which may be repeated during the same day. As to the tartar emetic, a mixture should be made containing from one and half to two grains of this substance, and a teaspoonful administered every half hour until vomiting is produced. After the third vomiting its use should be suspended, but it may be recommenced during the day, if necessary.

In general we must not be afraid to employ this method with energy, for it is in this manner alone that it can be useful. If the tartar emetic should produce too copious alvine evacuations, with a decided change in the countenance, its employment must be immediately discontinued.

[M. Trousseau speaks most highly of the sulphate of copper as an emetic in croup, as recommended by Berignier. The efforts which it induces often detach the false membranes; this emetic seeming to act less on the stomach than the pharynx, while it does not derange the digestive organs as antimony sometimes does. Vomiting occurs very often, and is repeated, at very short intervals, three or four times; and in three or four hours the medicine may be again given. M. Berignier gave from two to three grains, but M. Trousseau gives as much as ten grains divided into two doses.—P.H.B.]

Sternutatories. Irritant fumigations with vinegar, the insufflation of some grains of snuff into the nostrils, have been employed against croup, under the title of mechanical means, likely to favour the expulsion of false membranes. Their use can only be attended by favourable results when these accidental productions are loose and ready to be detached. This may be known by the characters of the

respiration, which is distinguished by a sort of valvular sound of the cough, which is thick and mucous, and by the tracheal rattle, which indicates the presence of bronchial mucosities.

Topical medication. In this case, the information acquired concerning the chemical composition of the false membranes is turned to account. In order to destroy them, those substances are employed which have the property of dissolving or of detaching them; alkalies dissolve them; acids corrugate them very considerably.

Cauterization by acids is the best means to employ. Dilute nitric and hydrochloric acids are generally made use of, and nitrate of silver in the dose of 150 grains to ℥ j of distilled water. A small piece of fine sponge should be firmly fixed at the end of a portion of curved whalebone; when the sponge becomes moistened, it should be slightly pressed, and carried into the larynx and on the glottis, so that some drops of the caustic liquid may penetrate into the larynx.

This is a very disagreeable operation for the child; it leaves a very unpleasant taste in the mouth, and determines violent efforts of vomiting which are distressing, but salutary. It should be practised from the commencement of the disease, if the false membranes are perceived in the pharynx, and repeated twice a day at least, as long as these products exist on the surface of the mucous membrane.

If the cauterization of the back part of the throat and of the upper part of the larynx is advantageous, it has also its inconveniences, which it is necessary for us to be acquainted with so that we may avoid them. Immediate suffocation may be the consequence if we leave the sponge for too long a time in the glottis, or if too great a quantity of the solution has penetrated into the larynx. This is a very serious accident, for it may cause death, or at least necessitate the immediate performance of tracheotomy. We may avoid it by the most simple precautions; the cauterization should be rapidly performed, and the whalebone withdrawn from the mouth before vomiting is excited: the sponge should be but slightly compressed, and should only contain a small quantity of the solution, in order that it may not fill up the larynx or the œsophagus. This I have seen happen to an inexperienced practitioner.

By this mode of proceeding, all the advantage to be derived from this important method of treating croup is obtained, and its use is not compromised by imprudent, half measures.

The different methods of treatment, of which we have just spoken, are never employed in an exclusive manner. Each one presents great advantages when the appropriate employment of it is known. In order to derive every advantage from them, the mode of combining their action should be understood. The following are the results of our experience on this point.

Three children, successively attacked with croup, were treated by

a combination of emetics and cauterization; one at the Necker Hospital, in the practice of M. Trousseau, the two others in town. All the three were cured; but it must be added, that during the treatment a strict attention was bestowed which much favoured the result.

These patients were visited every five hours. From the commencement of the attack, the back of the throat and the superior opening of the larynx were cauterized by the nitrate of silver, and the operation was repeated each day, three or four times in the twenty-four hours, until the false membranes of the pharynx disappeared. At the same time, tartar emetic was also administered in the day time, and repeated once or twice until vomitings were produced. The false membranes were ejected. The cough entirely extinguished, became gradually stronger, more humid, and less hoarse. The voice gradually resumed its intensity, and the functions, disturbed for a time, returned to their natural course. It appeared to me evident that these three children only escaped death by the rational employment of these combinations of these two modes of treatment. This result deserves to be recorded. It would possess the greatest value if, as may be hoped, fresh observations should corroborate it.

[Dr. Alley of Boston (*Journ. f. Kind.;* p. 451) gives an account of a case treated in the way recommended by Dr. Green of New York, viz., applying a strong solution of nitrate of silver to the larynx, &c., through the glottis; much false membrane was thus brought away or detached, and afterwards ejected. The child, aged four, died. The *post mortem* examination showed the lungs to be quite healthy, with the exception of the upper lobe of the left lung, which could not be inflated. From the rima of the glottis to the first bifurcation, false membrane was plainly perceptible, and the bronchial ramification leading to the left lung was filled with it. But it was interesting to observe that the course of the sponge along the trachea was easily recognizable by the false membrane being completely detached in this spot. In the *American Journal of Medical Science*, is an interesting account by D. R. Gibbes, of the treatment of a case of croup following ulcerated sore throat. Dr. Gibbes commences by stating that such cases are rarely cured; after all the usual means had failed, a saturated solution of nitrate of silver was applied to the fauces and far back into the pharynx with success. In the *Southern Medical and Surgical Journal* for June, 1848, Dr. Bryan relates a case especially valuable; because, with the exception of a few grains of calomel, the nitrate was alone trusted to—the strength was 40 grains to ℥ j. Dr. Alex. Wood has used it in four cases with perfect success. Two of the cases related are especially interesting, as the cases seemed hopeless.—*Edin. Med. and Surg. Journ.*, January, 1854.—P.H.B.]

Tracheotomy. When all the preceding means have failed, and the disease having every day become more serious, has produced that state bordering on asphyxia in which a fit of suffocation might cause the death of the child, there must be no longer hesitation, a new way to the exterior air must be opened artificially; tracheotomy must be performed.

There is nothing new in this operation. It had been formerly applied to patients suffocated by the various anginæ and by croup; but it had been abandoned.

Lastly, thanks to the perseverance of MM. Bretonneau and Trousseau, it has come into favour again. These physicians have rendered a true service to humanity and to science; for tracheotomy is, in fact, the only resource to be employed in the extreme stage of croup.

This operation is of easy execution, as will be seen further on; it is not of itself serious, and if it does not succeed more frequently it is because the cases in which it is employed are truly beyond the resources of art.

Thus, tracheotomy has the greatest chance of success when it is practised on a child suffocated by croup of the larynx; it has much less when the false membranes descend into the trachea; and it may be said that it has none when these false membranes extend themselves into the bronchi.

Nevertheless, as it is difficult to diagnose the seat of croup in a precise manner, we must, under all circumstances, at the moment of asphyxia, or of serious complications, decide to practice the operation.

Immediately after tracheotomy the respiratory functions are reëstablished and the fits of suffocation are observed to disappear, at least for a time. The children are reanimated; some resume their amusements and they appear to enjoy a state of well-being quite unhoped for. Unhappily this state of things does not always remain in a definite manner; the attacks of asphyxia reappear, and death is the consequence of them.

Tracheotomy, however, is constantly followed by the prolongation of the life of the patients. Such a recourse is not to be despised; in this moment of respite, the false membranes of the larynx and of the trachea may be ejected, and the inflammation of the mucous membrane may be dissipated.

Tracheotomy is then the ultimatum in the treatment of croup. The medical attendant should always be ready to operate in such cases, when the fits of suffocation become more frequent and when asphyxia is imminent.

The following are the rules which should be followed in the practice of this operation. M. Trousseau has pointed them out in a very precise manner, in a chapter of the work of MM. Rilliet and Barthez, and still more recently in an article in the *Union Medicale*. He thus expresses himself on this head.

"When the practice of the operation is decided on, is tracheotomy or laryngo-tracheotomy to be performed?

"Those who especially appreciate simplicity in an operation, prefer laryngo-tracheotomy; their practice being based on the following considerations:

"A lesser number of parts is interfered with; fewer venous vessels are met with; the air tube is more superficial—a very great advantage in children whose neck is thick and short. There is never any risk of wounding the arteria innominata, or the common carotid of the left side, which, in certain abnormal dispositions, crosses the trachea.

"These considerations possess some value.

"The operation is more easy I confess; as to the immediate dangers of tracheotomy, compared with those of laryngo-bronchotomy, I know not how to compare them, for having practised the opening of the trachea 121 times, I have never had immediate accidents to deplore, except in an adult, who died of syncope at the moment I made the section of the skin. It undoubtedly might happen that I might meet with some arterial anomaly; but, as I make it a matter of duty to operate very cautiously, and not to make a cut with a bistoury without being safely directed by the finger and by the eye, I feel persuaded that I should avoid the left carotid, even if it arose from the arteria innominata, and crossed the superior part of the trachea. As to the arteria innominata, I have several times had it under the edge of my bistoury; but, by inclining the section towards the left side, and by separating all the tissues with the finger and with the retractor, I have finished these operations, apparently so perilous, without fear and without accident. Surgeons who pride themselves on performing the operation with wonderful celerity, and who fearlessly plunge the bistoury into the trachea to divide from below upwards, as soon as they have finished the incision of the skin, finish by deploring this imprudent and useless celerity, when they have discovered under the edge of the knife vessels which it is so easy to avoid when we would rather operate surely than quickly.

"By the side of these advantages of laryngo-tracheotomy, advantages which do not possess a very great value, let us place the inconveniences.

"In the case of croup, the introduction of a canula which is to be retained in an indispensable condition. This canula should be of large size, it should remain at least six, and sometimes fifty days. But the canula is fixed below the thyroid cartilage, through the crico-thyroid membrane, and between the lips of the divided cricoid cartilage. At the point of contact of the canula, a violent inflammation comes on, and purulent infiltration, which, in the case of tracheotomy, almost constantly occasions the denudation and the necrosis of the cartilages around the lips of the wound of the trachea. What happens to the cartilages of the trachea, will also happen to the cricoid and thyroid cartilages; and what in the trachea could not lead to any kind of bad symptom, because the elimination of the necrosed products is easily accomplished and without appreciable narrowing of the air tube, would become, on the contrary, in the larynx itself, the cause of the most serious accidents; for the croup being cured, we have yet to cure the necrosis of the cricoid and thyroid cartilages. But here the enucleation of the necrosed portions is accompanied by chronic inflammation, and by suppuration; we must fear either that the form of the larynx will be for ever deformed, or that the swelling of the laryngeal mucous membrane will occasion orthopneic symptoms as serious as those of croup, or that, at least, the voice will be for ever compromised.

"These considerations alone should be sufficient to cause the rejection of laryngotomy in the case of croup. There is, lastly, one which, although possessing less value, does not the less merit to enter into the balance; it is, that by tracheotomy, the air tube is opened much lower down, and at a point which the false membranes have not yet invaded, or at least which they would invade at a much later period than the larynx; so that in opening the trachea we have more chances of being able to prevent, by an opportune plan of treatment, the extension of the disease into the bronchi.

"Tracheotomy being decided on, how should the operation be practised?

"The necessary apparatus consists of a table, on which should be placed a small mattress, or, simply a sheet several times doubled; a small, hard, well compressed cushion, which should be placed under the neck of the child; two basins, with several sponges; waxed thread; and a ligature needle.

"The instruments are—an ordinary straight bistoury; a blunt pointed bistoury; two blunt hooks, which may be readily replaced by two pieces of curved iron wire, or by women's hair pins; a dilator; a double canula, the diameter of which should vary according to the age. The same canula may serve from one to three years of age; one, a size larger, from three to six; and one, still larger, from six to twelve.

"The outlet of this double canula should be large and have a perfectly smooth edge. Models of these instruments may be seen at the principal makers of Paris, who have added some slight improvements.

"At day time three assistants at least are required; at night one assistant more, to hold the light.

"The child being placed on the mattress, the cushion is placed beneath the neck and shoulders, so that the head may be thrown back and the trachea projecting. If the cushion is only under the neck, the little patient at the first cut of the bistoury brings the chin closer to the sternum, tries to slip downwards, and the trachea becomes more deep and shortens, so much so that it is difficult to seize it. Many times I have seen an extremely difficult operation become simplified in the twinkling of an eye, simply by placing the cushion under the shoulders as well as under the neck.

"Before making the incision of the skin, I trace, with a piece of burnt wood or a little ink, a line from the base of the thyroid cartilage to the upper part of the sternum. In this way the incision of the skin is straight and the direction of the bistoury is all the more certain during the remainder of the operation. This slight precaution, which surgeons look upon as superfluous, is very useful to unskilful physicians like myself; and I cannot say how often I have congratulated myself for having had recourse to it.

"The operator, placing himself on the right of the patient if he makes use of his right hand, forms a fold of skin, which he confides to the assistant placed on one side opposite to him, and he incises this fold in its entire thickness, following the line previously traced.

"He then incises in the median line and separates the muscles, either with the handle of the bistoury, or, what is still better, with a grooved director, taking care to have those of the left side retracted with a hook, whilst with another hook he himself retracts those of the right side. He then meets with a rather thick layer of cellular tissue, the thyroid venous plexus, and the isthmus which unites the two lobes of the thyroid body. Up to this point the operation has not presented any difficulty, nor has it required any great care, but now circumstances which demand a little more attention present themselves. The veins of the thyroid plexus most frequently run in nearly a parallel direction to the axis of the body; with some attention they need not be divided, by gently incising the cellular tissue which unites them and retracting them with the hooks. When they completely cross the trachea, as occasionally happens, they may be tied on both sides previous to the incision of the part which cannot be avoided, and then the cut is made between the two ligatures. I have not yet tied the veins in a young child, but I can understand that the physician, yet inexperienced, should avoid the incision of the large veins, for the extent of the hæmorrhage may embarrass him, and cause him to act with too much precipitation. If, however, a large vein should be divided, have no fear, introduce a finger into the *inferior* angle of the wound and one into the *superior*

angle; sponge, wait, and usually before a minute has elapsed the flow of blood is already very considerably reduced.

"If the isthmus of the thyroid body presents itself under your bistoury, never hesitate to divide it in the mesial line; there is usually an arterial jet as large as a thread which ceases after some seconds, and by this section you have singularly facilitated the operation.

"Continue, then, the incision in the median line, frequently introducing the index finger of your left hand to be assured that you are on the trachea and not on the side of this tube; do not make a cut with the bistoury until after you have sponged it; always retract with the hooks all that you have incised, and you will thus arrive at the cartilages of the trachea, which you will recognize by their white colour and by their hardness. Do not now be in a hurry to divide the trachea, lay bare three or four rings, suspend the operation for an instant, place within reach or in some manner under your hand the probe-pointed bistoury, and the dilator of the canula. Having done that, carefully sponge the bottom of the wound and the trachea, and make a very small puncture in the trachea with the point of your bistoury. As soon as you have heard the hissing of the air, place the index finger of the left hand on the opening you have just made, take your probe-pointed bistoury, and, pushing it into the trachea, cut upwards and downwards, so as to make an opening to the extent of half an inch at least. Do not be at all dismayed at the entrance of a little blood into the trachea, and at the noise occasioned by the air, the mucus, and the false membranes which escape by the incision; introduce your dilator, and open the wound of the trachea, take the canula in the left hand, passing it between the two expanded blades of the dilator, and when you hear the air pass through the canula withdraw the dilator, make the child sit up, tie the strings of the canula behind the neck, and all is finished.

"The slight hæmorrhage which may still exist may become arrested; a violent cough expels the blood and the mucosities which may be present in the bronchi, and the respiration is soon quietly established.

"Surgeons may consider all these details very puerile. Those physicians who have not yet performed tracheotomy, those also who have already practised it, may perhaps thank me for giving them.

"But this operation, so simple in the child, is a very difficult one in the adult. Here it is necessary to tie the divided vessels from the risk of observing the hæmorrhage persist after the tracheotomy. Here the trachea should never be opened before the flow of blood is arrested. Out of eleven operations of tracheotomy performed on the adult for chronic diseases of the larynx, I have several times deeply deplored not having taken the most minute precautions. I have, however, never tied any vessels, but twice I encountered severe hæmorrhages which were prolonged after the tracheotomy and which I had much difficulty in stopping. If I had now to perform this operation again in similar circumstances, I should not hesitate to tie all the large venous vessels which bleed, and I should not open the trachea until I felt perfectly assured about the hæmorrhage.

"*Accidents during the operation.* The accidents which come on during the operation are—hæmorrhage. It has just been stated how unfrequent and how trivial it is. If a large number of the thyroid veins are divided and if the blood flows freely, the trachea should be fixed between the ulnar border of the index and the radial border of the middle finger, pressed back to the vertebral column, and the trachea should be clearly and rapidly incised from below upwards, and then introducing the dilator; the hæmorrhage will be arrested. I do not refer to the hæmorrhage which may result from the section of a thyroid

artery or even of the brachio-cephalic trunk; it would here evidently be necessary, from the risk of the life of the patient, to tie the vessels before terminating the operation. I am not aware whether this accident has yet happened; but I have several times felt the arteria innominata beat under the end of the finger, and it would doubtless have been divided if I had carelessly carried my bistoury into the inferior commissure of the wound.

"I have seen a patient die of convulsions during the operation; this occurred in the case of a man fifty-two years old on whom I operated at the Hotel Dieu, on account of a laryngeal affection which occasioned an extreme degree of suffocation. The patient instead of being reclined, was seated in a chair, which was a great fault on my part; I had scarcely incised the skin when an epileptiform convulsion came on. I was imprudent enough to continue the operation, and before I had reached the deep cervical aponeurosis, a second convulsion appeared which was immediately followed by death. I placed the patient on a bed, opened the trachea and introduced a canula, but the divided vessels allowed blood to flow into the trachea, which was not expelled, and nothing could reanimate this patient, who was perhaps the victim of my inexperience.

"I have several times observed asphyxia occur and the respiration cease during the operation; the patient was in a state of apparent death. I finished the operation as quickly as possible and introduced the canula; and after placing the patient on the side, if blood flowed into the trachea, and on the back in the contrary case, I made alternate pressure on the belly and on the chest, which expelled the air from the lung and brought fresh air back again, and all my patients returned to life.

"Syncope is a much more frequent accident. It usually manifests itself immediately after the operation, at the moment when, the respiration becoming free, the cerebral congestion suddenly ceases. I have once seen it last nearly an hour; it has never proved fatal. I confine myself to the sprinkling of cold water on the face, sponging and sprinkling the trachea in like manner, at the same time placing the patient on the back.

"As to the introduction of blood into the trachea which has occupied so much attention, I have never observed this accident possess the slightest danger, provided that the dilator which keeps the edges of the trachea widely open is immediately made use of, or by some means the immediate introduction of a large canula is effected; for if after having incised the trachea the surgeon fumbles and cannot introduce the canula, at each inspiration blood is drawn into the trachea; and as air cannot enter at the same time, an almost immediate asphyxia may be the consequence of it; added to which the hæmorrhage continues, because the respiration all the time remains impeded.

"But if, on the contrary, the wound of the trachea is kept open by a dilator, the air readily penetrates, powerfully ejects the small quantity of blood which has entered, and the return of the normal respiration causing the hæmorrhage to cease, the entrance of the blood does not take place; and if, by chance, some small quantity of blood still dribbles into the bronchi, the patient usually gets rid of it himself, and a slight sponging suffices to assist this repulsion in case it may be difficult.

"The respiration usually becomes very easy immediately after the operation. If it remains embarrassed, it is because some clots of blood or false membranes fill the principal bronchi. When it is only caused by clots of blood, it is sufficient, whilst the trachea is kept open by means of a dilator, or even after the introduction of the canula, to drop in the bronchi several drops of cold water; and this may be once or twice repeated.

"When false membranes are present in the trachea, it is proper to leave the dilator in the wound until these foreign bodies are got rid of, the expulsion of which is also favoured by the dropping of cold water into the bronchi. Sometimes, in spite of this means, the false membranes remained fixed by the roots which they have extended into the lungs, at the same time that the upper portion is broken and detached. In this case we should endeavour to seize them with a pair of forceps, between the lips of the wound, and exercise slight traction on them, which is usually sufficient to remove them.

"The wound is dressed with simple cerate, a hole being made for the passage of the canula; the double canula is then introduced, which is firmly fixed by means of two strings which are firmly tied together behind the neck. When the operation is finished, the neck of the child should be slightly wrapped up, so that the expired air should be partly breathed again, thus preserving the warmth and especially the humidity. It thence results that the mucus of the trachea and of the bronchi does not become hardened, that the expectoration is easy, and that injections and sponging are never necessary.

"Each time that the respiration appears to become embarrassed, and even when no embarrassment occurs, the canula should be withdrawn about every three hours to be cleaned, after which it should be immediately replaced.

"The wound sometimes becomes covered with false membranes; as soon as they are observed, they should be thoroughly cauterized, morning and evening, with hydrochloric acid.

"When, after the fourth or fifth day, the patient appears to progress towards a favourable termination, we need not fear to allow the canula to become slightly clogged up, so that the air, striking against the larynx, detaches the mucosities and the false membranes, and forces a way through that organ. The degree of the permeability of the larynx can thus be very well measured. This is so much the more important since the capital precept in tracheotomy is to withdraw the canula as soon as possible.

"When the canula is removed the edges of the wound should be closed by adhesive plaster. This dressing, which should be removed two or three times a day, suffices in the greater number of cases. A few days are usually sufficient for the wound in the trachea to be completely closed; the solution of the continuity of the deep tissues and of the skin then remains, which soon heals, leaving a cicatrix which is but slightly disfiguring.

"Only once was I able to remove the canula for good at the end of four days, sometimes on the sixth or eight day, usually from the tenth to the thirteenth, once on the forty-second; and, lastly, once on the fifty-third day. When no bad symptoms come on, the liberty of the larynx then becomes reëstablished from the fourth to the thirteenth day.

"I have never yet met with a single instance of tracheal fistula remaining after tracheotomy."

[Dr. Karl Weber relates a case (*Henle's Zeitzchrift;* band iii, heft 2, p. 8) in which croup came on after measles: tracheotomy was performed on the ninth day; the patient died on the forty-sixth day, and after death it was found that the canal of the trachea above the canula was completely closed. This was discovered first of all when, on the tenth day after the operation, the symptoms being exceedingly favourable, the canula was removed; immediate suffocation ensued, and the canula was reinserted. Further operative proceedings were contemplated, when the child suddenly died; not from asphyxia, but from an undetermined cause. The larynx and trachea were removed, but no further examination of the body was permitted.

The larynx examined and described by Henle was healthy till below the lower vocal cords, where there was complete closure by means of a vascular, firm, white substance, torn with difficulty, and constituted partly by uniting tissue and partly by a similar forming structure. The mucous membrane could not be discovered. The fistulous opening, formed by the canula, resembled a mucous membrane, and was covered with flat nucleated epithelium cells 0.008‴ in diameter.—P.H.B.

On the treatment after the operation. Formerly M. Trousseau, following the example of M. Bretonneau, only performed tracheotomy in order to inject caustic solutions into the trachea and into the larynx, so as to detach the false membranes and to extract them by means of sponges. M. Trousseau has now renounced this practice, which he considers as dangerous, and contents himself with simply cauterizing the edges of the wound if they become covered with false membranes, or the interior of the mouth if these products still exist on the tonsils.

[The practice of sponging out the trachea and larynx after the operation of tracheotomy seems to be generally abandoned, except under very particular circumstances, as it is not unattended with danger; for "if the sponge is too highly loaded with the solution, the latter may flow down the bronchia and cause serious accidents; so that we only employ it when the formation of the pseudo membrane reoccurs, and can be removed only with the greatest difficulty. Often the wound itself must be cauterized, which becomes covered with false membrane a day or so after the operation. I always cauterize it at once, and so prevent this complication arising."—Guersant, *Journ. f. Kind.;* p. 447.—P.H.B.]

Moreover, he places the children in a well ventilated apartment, at a moderate temperature, the neck being loosely wrapped up, and the internal canula being withdrawn every two or three hours in order to clear it.

"After the operation the children eat and drink very readily. This state of things usually continues for four or five days, when it is noticed that they swallow a little the wrong way. Each time that they drink, a convulsive cough comes on, and several drops of the drink are observed to escape by the canula. That symptom usually continues for five, ten, and even fifteen days, especially when the children drink quickly. It even continues when the canula is removed, and when the wound of the neck is completely closed. Most frequently the quantity of liquid which thus passes through the larynx is very trivial, and only causes a slight inconvenience; but sometimes nearly the whole of the liquid enters into the trachea and into the bronchi, causing serious inflammatory symptons, and the children then refuse to drink anything whatsoever.

"When this accident happens, I make it an almost invariable rule to deprive the children of drink; to give them thick soups, and especially vermicelli; maccaroni dressed with milk or broth—but taking away the milk and the broth; fish; underdone meat, cut in rather large portions; and I avoid this series of accidents. They thus swallow solid food; regain their strength; and with the strength, the facility of deglutition becomes reëstablished, and the children can soon drink, provided they do it slowly."

The topical medication of M. Bretonneau (de Tours), and which M. Trousseau appears to have now abandoned, should only be employed in the following manner:

"If the child is vigorous; if it has energetically expelled the false membranes contained in the air tubes; and if, after the operation, the respiration is very free, we should drop into the trachea, before introducing the canula, fifteen or twenty drops of a solution of four grains of nitrate of silver to ℥ j of distilled water, at two or three times. This is repeated four times the first day, three times the

second and the third day, once or twice the fourth day; it may then be left off altogether.

"At the same time the trachea is to be touched with a small piece of sponge fixed to the end of a very flexible piece of whalebone, and moistened with a concentrated solution, fifteen grains of nitrate of silver to ℥ ij of distilled water.

"This last means is sufficient if there is room for supposing that the larynx has alone been invaded. The cauterization by the sponge should be made as often, and for the same length of time, as the instillations through the canula.

"The instillations of water and the spongings still hold an important position in the treatment.

"If the cough is loose, if the expectoration is easy, it is not necessary to drop in the water. In the contrary case, eight or ten drops of tepid water should be dropped in, once or twice an hour; it becomes mixed with the mucosities, softens them, and will facilitate their ejection.

"Water should always be dropped in after the application of the nitrate of silver, so as to separate the mucosities which may have become coagulated, and to facilitate the expectoration. The instillations of water should be made several times in an hour; when the respiration becomes frequent and *serratic*, that is to say, imitating the noise of a saw in cutting stone, it is proper to make them after each application of the sponge.

"The sponging should be employed as often as the canula or the trachea appear embarrassed. The sponging will be rendered more efficacious by the previous instillation of water. If a flapping noise is heard in the trachea, or a peculiar hissing leads us to suppose that there are some false membranes loose, the sponging should be repeated several times until these false membranes are detached and expelled. The sponging will never be more efficacious than when it is performed at the moment the canula is withdrawn, and when the lips of the wound of the trachea are kept widely apart by means of a dilator. The sponging is the more necessary in proportion as the symptoms which follow the operation are more unfavourable. It never causes bad symptoms; it is always followed by a greater calmness of respiration, even when the children are in their last moments, and when the sponge withdraws neither mucosities nor false membranes."

Although the success of tracheotomy is not very brilliant, the results are, however, such that they ought to encourage the medical attendant of a child half asphyxiated by croup. M. Bretonneau, out of twenty operations, has saved six children; out of one hundred and sixty, I have saved forty-five. M. Leclerc (of Tours), who has adopted the same treatment, reckons one successful in two operations he has performed. M. Velpeau has cured two children in ten. M. Pétel (de Cateau-Cambrésis), who has followed the same steps, has performed three successful operations out of six he has attempted. Thus, in one hundred and ninety-eight operations of tracheotomy, fifty-seven successful cases may be reckoned, that that is to say, a little more than one fourth.

[Mr. Smith (*Med. Times and Gazette*, March, 1853) relates four cases of croup in which tracheotomy was performed. All the patients were in extremity, and in all the result was fatal. M. Guersant (*Bull. de Therapeut.*, xlii) refers to a case in which tracheotomy was performed twice in the same child. M. Guersant has now operated

150 times. The earlier cases were less successful than the later, thirteen of the last forty private cases, and thirteen of the last thirty-one hospital cases recovered, or at the rate of 36.62 per cent. In three cases there was faulty deglutition after the operation, and food escaped through the tracheal opening. In such cases the child must be fed through the œsophageal tube passed in through the nares.—P.H.B.]

APHORISMS.

150. Croup exists from the time that false fibrous membranes are developed on the mucous membrane of the larynx.

151. A smothered, hoarse, dull cough, followed by a metallic hissing, and accompanied by fever and anhelation, reveal the presence of croup.

152. In croup, extinguished cough and voice, together with noisy, rough, serratic respiration, announce the approach of asphyxia and death.

153. Croup advanced to the stage of the fits of suffocation is fatal.

154. There are some cases of croup which may get well and others which are cured.

155. Croup should be treated by repeated emetics alternating with doses of calomel.

156. Croup arrived at the period of the fits of suffocation, where death appears imminent, should at once be treated by tracheotomy.

CHAPTER II.

ON FALSE CROUP OR STRIDULOUS LARYNGITIS.

The name of false croup, or stridulous laryngitis, is given to a nervous affection of the larynx, which has the greatest analogy with croup, but from which it is easy to distinguish it. This disease is rarely observed quite alone; on the contrary, it is developed in the course of bronchitis and of the inflammatory affections of the organs of respiration.

It is characterized by a fit of suffocation, which comes on suddenly, and may determine asphyxia of the children.

This division of membranous laryngitis and stridulous laryngitis has been for a long time opposed, and numerous errors have been committed in referring to the presence of false membranes in the larynx, attacks of suffocation, purely nervous, in children who were not labouring under croup. They refused to admit the fundamental distinction between these two diseases, so essentially different in their nature, although similar in some of their symptoms. Observation has at last come to demonstrate their existence. The honour of this discovery is due to M. Bretonneau, and especially to M. Guersant, for up to this period pseudo-membranous and false croup were confounded in the minds of medical men. Many imagined they had cured true croup when they

had only vanquished the nervous fits of suffocation which were insensibly getting better.

Causes.

Stridulous laryngitis is common enough. It only affects very young children, and especially infants at the breast. It may be several times observed in the same children. Some have always at the commencement of their colds, one or two attacks of stridulous laryngitis. As M. Guersant has remarked, it is probable that certain cases, cited by authors as examples of the return of croup, belonged to simple false croup, and that Jurine and Albers have been mistaken in this respect, and have confounded different diseases.

Symptoms.

Stridulous laryngitis usually commences in the night, in children who had fallen asleep in a perfect state of health, or who had only a simple catarrhal affection of the bronchi. It also manifests itself, but very rarely, in the middle of the day. Lastly, it is observed as a complication in the course of pneumonia.

The children suddenly experience a deep, very distressing sensation; they awake very agitated, with considerable difficulty of respiration; their cough is loud, dry, *sonorous*, hoarse, and hissing, returning by prolonged fits which each time threatens them with suffocation; their face is swollen, red, bluish; they are in the most distressing agony, and fall back tired, pale, and covered with perspiration. At each attack, these phenomena reappear; then the symptoms vanish, and the children relapse into their usual quiet condition.

The pulse preserves a considerable frequency, the voice is roughish, but distinct; the cough is scarcely altered, and respiration is quietly performed.

If the back of the throat is examined, neither redness nor the accidental productions similar to those of croup are observed, and there is no engorgement of the submaxillary glands. Auscultation does not usually reveal any alteration in the lung. A sibilant or mucous râle is heard which belongs to bronchitis. In some very rare cases, abnormal sounds of respiration are heard which are in connection with pneumonia.

The attacks of the suffocation of false croup last about one or two hours. The symptoms, at first apparently very severe, gradually diminish in intensity and completely disappear. Their progress is quite different in true croup. They increase, on the contrary, uninterruptedly until death.

When the fit is over, the child calmly reposes until the production of fresh attacks which sometimes reappear, but very seldom, in the

same night. The fresh attack does not usually return until the following night, it is always less violent than the first and lasts a shorter time than it. Thus three or four attacks of suffocation are observed during three or four consecutive days. They are daily less severe and less prolonged.

Stridulous laryngitis thus terminates sometimes after the second or third attack, without leaving traces of its visit, unless it develops bronchitis or febrile phenomena.

Stridulous laryngitis usually marks the commencement of a slight catarrhal affection of the bronchi. Then, at the end of the attack, the children retain a little fever, they continue to cough, but their cough does not present any important character, their respiration is scarcely at all obstructed, and the rales of which we have above spoken are heard in the chest. This condition is never very serious, the children are cured at the end of several days.

Diagnosis.

As may be observed, the progress of this disease is essentially different from the progress of true croup. In stridulous laryngitis a sudden invasion of frightful symptoms of suffocation is observed, which cease, appear afresh with less intensity, and finally disappear in a definitive manner. The intermission is well characterized. Moreover, the first attacks are the strongest, and they diminish in proportion as the disease is prolonged. In their interval, the health does not appear to have suffered any serious derangement.

Pseudo-membranous croup is, on the contrary, characterized by a morbid state which daily becomes more serious; and when the attacks of suffocation manifest themselves, the first are scarcely felt, but they become more and more violent, to the extent of occasioning death by asphyxia. In their interval the children are a prey to a dreadful obstruction of respiration, the colour of their face clearly indicates the existence of an obstacle which impedes the performance of the respiratory functions.

Lastly, the examination of the back of the mouth does not furnish any result in stridulous laryngitis: it points out, on the other hand, the nature of the disease in true croup, as there are frequently observed upon the mucous membrane, false membranes which constitute its unexceptionable character.

We must then recognize, with MM. Bretonneau, Guersant, and the greater part of physicians, the existence of a disease which slightly resembles croup in some symptoms, and which yet is not croup, since the progress and nature of the disease are entirely different. This disease is stridulous laryngitis.

It is important it should be recognized that it may not be treated

by the means which are employed against membranous laryngitis or true croup. This has indeed very often happened, but undoubtedly it will never occur again.

Stridulous laryngitis, with its fit of noisy suffocation, with its sonorous, rough, and hissing respiration, is distinguished from phreno-glottism, that is to say from phreno-glottic convulsions; in short, in the latter disease the respiration, nearly motionless, is performed without noise, and it is at the end of the attack that a single sonorous sound announces the entrance of air into the larynx and the termination of the phrenic convulsion.

Prognosis.

Stridulous laryngitis is apparently a very serious disease; it seems to put the life of the children in jeopardy; one would say they were going to perish in the midst of the attack; but if the testimony of M. Guersant on this point is to be credited, this result has never yet been observed. It is more usual to see the disease cease of itself and rapidly disappear under the influence of an appropriate treatment, or to prolong itself, on the contrary, when the therapeutical means have been improperly selected.

Treatment.

Simple stridulous laryngitis should be treated by means of sedatives and ordinary antispamodics administered in draught or by enema. Gum juleps with ether containing a small quantity of tincture of musk or of the extract of valerian are very useful. They rapidly calm the agitation of the children and favour their repose. To the same end, enemata of valerian or assafœtida are administered in the proportions of four to eight grains of these substances to four or six ounces of water. To these means must be conjoined the use of cutaneous excitants, such as irritant pediluvia or sinapisms. The employment of blisters is qnite useless in this disorder.

When stridulous laryngitis manifests itself, as is usual in a child attacked with bronchitis, the extent of this disease must be investigated and the febrile condition attended to. The preceding means should be made use of, but consecutively to the administration of an emetic, ipecacuanha in preference, in the dose of from four to six grains in gum syrup for young children. This plan of treatment always produces a great amelioration.

False croup rarely necessitates the employment of local or general bleeding. The loss of blood is useless except in cases of inflammatory complications of the bronchi or of the lung. It is even injurious, for the blood is the regulator of the nervous system, *sanguis moderator nervorum*, and if this loss of blood does not produce as a consequence

the prolongation of the attack, it throws the children into a state of weakness which makes them ill for several days.

Such are the appropriate means to be employed in the treatment of stridulous laryngitis. They are quite numerous enough, and sufficiently varied. Great precaution must be exercised in their choice, so as not to make use of the most energetic amongst them against an attack which would cease quite naturally of itself. The last means are especially appropriate in the case of important complications, bronchitis or pneumonia. An emetic is then very advantageously employed. As to blisters and bleeding, they must be reserved for the most severe cases, and should only be prescribed when special indications are present.

APHORISMS.

157. A sudden nocturnal attack of suffocation, accompanied by a dry, hoarse, hissing, and sonorous cough, announces false croup.

158. False croup, very violent at its commencement, diminishes in a few hours, whereas true croup advances without intermission, daily increasing in intensity.

159. Two or three fits of suffocation, less and less severe, with an interval of twenty-four hours, characterize false croup.

160. False croup is very readily cured by the administration of an emetic.

CHAPTER III.

FOREIGN BODIES IN THE LARYNX.

It is rather rare to meet with foreign bodies in the larynx of children at the breast, in consequence of the small dimension of this organ; but still there are examples of this, and the one which I here report seems to me worthy of interest.

The kernel of a cherry fell into the larynx of a child two years old, and remained fixed there; suffocation necessitated the employment of laryngotomy, which was not followed by the expulsion of any foreign body. Just as the wound cicatrized the suffocation reappeared, and during the manœuvres which were made to reopen the wound, by means of a sound and other instruments, the child died asphyxiated.

Here is, in addition, a case reported in the *Gazette Medicale:*

Case. A child two years old, which would speak while eating cherries, the stones of which it swallowed, was suddenly seized by violent attacks of cough and a fit of suffocation. The asphyxia was imminent, and the account of the above circumstances also simplifying the diagnosis, M. Corbet immediately performed laryngotracheotomy. As soon as the respiratory tube was opened, the anxiety disappeared

and the respiration became free. The foreign body, however, was not met with. The wound cicatrized, and fifteen days passed during which the health was perfect and the respiration quite regular.

The opening into the trachea was then quite closed, and the external wound nearly healed, when the child was seized with symptoms still more alarming than the first. M. Corbet, without hesitation, incised the newly-formed tissue, introduced a female catheter into the trachea, and explored it in every direction, using the finger as well as a twig of whalebone armed with a small piece of sponge. The foreign body could not be discovered; the suffocation increased and carried off the child in one of the fits.

On making the *post mortem* examination, the respiratory tube was divided to the point of the bifurcation of the bronchi without anything being discovered. The fact that death supervened notwithstanding the very large opening of the cricoidean region, led to the supposition that the foreign body would be more likely to be met with below the wound. On cutting open the larynx, the cherry stone, which had descended into the trachea, was at length found, undoubtedly displaced by the movements which were made in order to place the head of the subject on a block. In fact, the right ventricle of the larynx was hollowed into a cavity formed by ulceration, and so placed that on introducing the stone into it its surface could be scarcely perceived, provided its large diameter was placed parallel to that of the ventricle.

It may be easily understood why the surgeon could not recognize the presence of this stone in the glottis, although during the second operation he introduced his two index fingers, one from above downwards by the back of the throat, the other from below upwards by the wound of the larynx, until they touched each other. But another instructive fact, more directly allied to the treatment, may be derived from this case: it is that in similar cases of fruitless search for foreign bodies after tracheotomy, roughly shaking the patient, in suddenly changing the position of the head, should never be neglected. It was this manœuvre which alone succeeded in the case of the engineer Brunel, in dislodging the piece of money which had up to that time resisted all means of extraction. The details of the autopsy just related prove that it was to movements of this kind that the displacement of the cherry stone in the body of the patient operated on by M. Corbet was also due.

Facts of this kind are not rare in children of more advanced age. Here is one which is not less curious than the preceding, and in which broncho-tracheotomy was equally useless in determining the expulsion of the foreign body. It occurred to M. le Docteur Rendu, a medical man at Compiègne.*

Case. Foreign body in the larynx. A child, five years of age, having by mistake swallowed a bean, was immediately seized by a fit of suffocation, which was repeated on the following days. M. Rendu practised broncho-tracheotomy, but the foreign body was not expelled, notwithstanding the extent of the wound. This had cicatrized, when a violent fit of coughing came on three months after the accident, and was

* *Bulletin de l'Académie de médecine.* Paris, 1850; t. xvi, p. 105.

followed by the quick expulsion by the mouth of purulent matter, in the midst of which was found the bean which had sprouted. From this moment the symptoms ceased, to return no more.

[One of the most remarkable instances of a foreign body getting into the windpipe without passing through the *rima glottis* is mentioned by De la Martinière (*Mem. de l'Acad. de Chir.*, vol. v), in which in a child a large copper pin without a head, about an inch and quarter long, had pierced through the windpipe from left to right. It was detected through the skin, cut down on, and removed. The child recovered in a few days.

The following case came under my own notice while house surgeon at the Queen's Hospital, Birmingham: A little girl about four years old was sucking a glass bead, and on taking a sudden inspiration it disappeared; the bead was described as hollow, made of thin glass, about an inch in length, and a quarter of an inch in diameter at the middle, whence it gradually tapered towards the ends. There was not much difficulty of breathing, and the foreign body could be heard moving up and down the trachea after a longer expiration than usual. After a little time, several partial attacks of dyspnœa having supervened, tracheotomy was performed by Mr. Knowles, and the bead was ejected with considerable force from the wound. The patient made a rapid recovery.

The time which a foreign body, after the first severe symptoms have passed by, may remain lodged in the air passages varies very considerably. An instance of a prolonged period is that mentioned by Sue (*Mem. de l'Acad. de Chirurg.;* vol. v, p. 533). A female, when nine years old, had the rump bone of a pigeon slip into her windpipe; she became subject to attacks of hæmoptysis and other symptoms of pulmonary disease, but without wasting, until her twenty-fourth year, when she began to decline rapidly. Two years after she threw up the bone in a violent fit of cough; but she died eighteen months after with profuse purulent expectoration. In a case which occurred at St. Thomas's Hospital, a girl, six years old, who was suddenly thrown back whilst eating cherries, was immediately seized with a violent fit of choking, and every symptom of impending suffocation. This condition lasted for an hour, and then she fell asleep. On the next day she had some spasmodic pain in the chest, and on the following morning the breathing was very difficult, and other symptoms of inflammation present, which were relieved by bloodletting, a calomel and jalap purge, and calomel and opium. On the afternoon of the fourth day she had a violent convulsive seizure, with cough, small quick pulse, a livid surface, suffused eye, and every sign of suffocation. The spasm subsided after two hours' continuance; and a few days after, she was so tranquil as to lead to the belief that no stone could have passed into the *trachea*. In the middle of the following day the fit returned, on the seventh day also, on the thirteenth, and, from that time, daily, till the nineteenth day when she had frequent paroxysms of croupy cough, attended with great restlessness and the peculiar grasping of the throat. Under these circumstances, tracheotomy was performed, but the stone was not thrown out; the breathing, however, became tranquil, and the cough also ceased. It returned, however, on the twenty-sixth day, but less severely. About six weeks after, the wound, which had been tented, healed; and soon after, the child coughed incessantly, had night sweats, with loss of strength and appetite. In this condition she remained till the ninety-sixth day after the accident, when she threw out the stone, together with a table spoonful of pus, during a violent paroxysm of cough; having expectorated pus, in small quantities, for many days previous. From this time the cough never returned, and the general health was soon reëstablished.—(*Med. Chir. Trans.;* vol. xxiii, 1840.)

In proof of what a large-sized body may be admitted into the larynx, Dr. Burow

(Casper's *Wochenschrift*, No. 39) relates the case of a boy, aged twelve, who, while engaged in blowing through the larynx of a recently killed goose, was seized with a cough, and swallowed it. Eighteen hours afterwards he presented symptoms of asphyxia; and, on passing the finger down to the rima glottidis, it was ascertained that the larynx of the goose had passed through it. The entire larynx of the animal was with some difficulty removed; and the child was quite well on the ninth day. The larynx of the goose had twelve rings of the trachea connected with it.—P.H.B.]

BOOK V.

ON DISEASES OF THE THYMUS.

The thymus is a very large gland, which begins to appear at the second month of intra-uterine life, and which gradually increases up to the time of birth. It increases even yet after this period, according to Haugsted, up to the end of the second year. It weighs from seventy-five to 300, 450 grains. It extends from the base of the heart to above the clavicles, and sometimes to the larynx. After the second year, this gland becomes atrophied and disappears.

The thymus is sometimes wanting in cases of acephalia. Sometimes it is very large, especially in strong and well developed children, but this disposition does not cause any special symptoms. Thus, in sixty thymus glands of children of from two to four years, which M. Hérard has examined, fifty had the normal weight of from fifteen to sixty grains, and ten weighed from 105 to 555 grains. The ten children to whom these thymus glands belonged, died; six of croup, one of acute laryngitis, one of asthma, one of small-pox, and one of meningitis. The special phenomena in connection with the glottis, which are referred to hypertrophy of the thymus, and which have been described under the name of thymic asthma, or the asthma of Kopp, are not absolutely allied to this hypertrophy. It is much more true to state that in the cases of asthma, considered as thymic, the thymus gland often preserves its normal dimensions, as the autopsies have demonstrated. This thymic asthma is only a spasm of the glottis and of the diaphragm, which has been previously described in the section on diseases of the encephalon, under the name of phreno-glottism.

1st. INFLAMMATION AND SUPPURATION OF THE THYMUS.

Collections of pus have sometimes been found in this organ; they have been remarked by several authors, but chiefly by M. Paul Dubois,

who attributes their formation to a specific inflammation occasioned by hereditary syphilis. In fact, this author has never met with this alteration except amongst infants exhibiting other phenomena of syphilis, or born of parents themselves affected with this disease, and that has sufficed him to establish the syphilitic nature of the alteration. This opinion will hold good as long as the possibility of a congenital suppuration of the thymus, independent of the venereal cause, is not demonstrated.

Care must be taken not to confound this abscess with the lactescent infiltration of fatty matter which is met with in the thymus in its physiological state.

[A single case is recorded by Portal, of a collection of serum in the thymus of a boy two years old. Alexander Wood refers to enlargement and induration of the thymus in children at the breast: and Hood directs attention to the doubtful fact that such enlargement and induration, when sufficient to exert marked pressure upon the veins conveying the blood from the head, may, under such circumstances, sometimes give rise to a hydrocephalic condition, and, at the same time, not rarely be accompanied by asthmatic trouble.

Dr. Mauch *(Die Asthmatischen Krankheiten der Kinder)* alludes to the frequency of scrofulous deposits in the thymus, especially during the first years of life, and details numerous cases. In connexion with pyogenesis in the thymus of children under two years of age, Dr. Mauch rejects the case of Sauvages, Naumann, Vogel, Billard, and Veron, as illustrative of the results of acute inflammation of the organ, and affirms that he knows of no satisfactorily recorded case of *inflammatio suppurativa* of the gland, or *thymelcosis*. Haugsted quotes a case of inflammatory softening, from Portal, and another from Mason, where the thymic abscess is stated to have opened into the trachea ; whilst Hasse observes that "inflammation of this gland is, in point of fact, very problematical." Dr. Mauch, alluding to the cases in which was found in the serous cavities, as also in the thymus, observes that these purulent collections cannot be regarded in the light of abscesses, the consequence of suppurative inflammation, "seeing that they are neither enclosed nor secreted by a special (secerning) membrane."—p. 79.

2ND. DEGENERATION OF THE THYMUS.

The thymus may be transformed into scirrhous tissue, into tubercular or calcareous matter. The schirrous transformation is unknown in the child, and the calcareous transformation is also very exceptional. Binninger has, however, seen it once in a little girl three years old, who died of a disease of the ung, with cough and considerable dyspnœa. The tubercular transformation is, on the contrary, rather frequent, and is observed in scrofulous children who die with the tubercular bronchitis, and of tubercles in most of the viscera.

BOOK VI.

ON DISEASES OF THE BRONCHI AND OF THE LUNGS.

CHAPTER I.

ON BRONCHITIS.

The term bronchitis is applied to inflammation of the mucous membrane of the bronchi. It is also designated under the name of cold and pulmonary catarrh. Children at the breast are those who are most likely to become attacked by this disease.

Bronchitis is a disease, the *extent* of which is variable; which comes on *primarily* or *consecutively* to another disease; and which manifests itself under the *acute* and under the *chronic* form.

The extent of it constitutes the most important phenomenon. In fact, it is useless to observe that partial bronchitis, which only affects the larger bronchi, is essentially different from general bronchitis, which, on the contrary, extends to the smallest bronchial twigs. This becomes nearly always changed into lobular pneumonia, and forms broncho-pneumonia; a circumstance which entirely changes the symptomatic expression, and which gives a much more serious aspect to the disease.

The causes of bronchitis, and the alterations of tissue which result from it, will first be investigated; then the symptoms and progress of the disease pointed out; and we shall terminate by indicating the method of treatment it requires.

Causes.

Inflammation of the pulmonary mucous membrane is a disease which is frequently observed in infancy, and especially in that period comprised between the moment of birth and the end of the first dentition. At this age the slightest causes possess a serious action, and easily determine the irritation of this membrane. General bronchitis is far from being so frequent as partial bronchitis. All children have had, in their life, one or more colds of slight importance. There is only a small number, on the contrary, in whom the disease has been sufficiently serious to cause anxiety to the parents, and to necessitate the calling in of the medical man.

Primary bronchitis is as frequently met with as secondary bronchitis. The former is, perhaps, even a little more frequent. The records of hospitals are not sufficient to determine this question, for a great number of cases of bronchitis are unnoticed by the physicians of the hospital, who only see the more severe cases. Besides, the greatest number of examples of slight bronchitis are those of primary bronchitis. It is then impossible to arrive at a precise determination on this point, unless the practice of the hospital is compared with that of the town, which no one has yet done.

The sex of the children has no kind of influence on the production of pulmonary catarrh. Boys, as well as girls, are indiscriminately attacked by this disease.

It is not equally observed at all times of the year. It is more especially during the winter and spring, at a time when the temperature is damp and low, and subject to considerable variations. The sudden or prolonged action of cold is the most frequent exciting cause.

It is preferably developed among children of the poorer classes, who are often badly nourished, insufficiently clothed, and whose parents are deprived of the resources necessary for keeping up a proper temperature around them.

We must place by the side of the influence of the hygienic conditions that which results from the habitual bad health of the children. Thus, although no relation appears to exist between the delicacy of constitution, the rachitic state of certain children, and the production of bronchitis, it is still not the less true that this circumstance very much predisposes to the development of this disease.

It is related in a very direct manner to the appearance of certain eruptive fevers, and especially measles. It is so frequent, during the course of this disease, that it must be considered as being especially connected with it. The fever of measles betrays itself on the mucous membrane of the bronchi as on the mucous membrane of the eye and nose. In addition to its being a well characterized eruption of the skin, it is also an irritation with inflammation of the mucous membranes. In fact, this bronchitis does not only differ in children at the breast from ordinary bronchitis, the same difference also exists, and well marked too, in the adult.

The inflammation of the mucous membrane of the bronchi is usually a sporadic disease; it occasionally attacks a great number of children at a time, and rages equally in adults; it reigns in an epidemic manner. Most authors have observed epidemics of this kind. Mention is made of them by Stoll, Sydenham, Fothergill, Lepecq de la Cloture, &c., and in some modern works, as those of Pétrequin, Piedagnel, &c. Lastly, and by this remark we finish, this disease is so common in certain places, when young

children are collected in considerable numbers, as at the Hôpital des Enfants Trouvés, that it may be considered as epidemic. It chiefly results from the little attention bestowed on the children, and from the influence of the unfavourable hygienic conditions which surround them.

Pathological Anatomy.

Under the influence of these causes, modifications in the structure of the mucous membrane of the bronchi occur. They are always developed on both sides in the whole bronchial tree, and are constantly more intense on the right side. The mucous membrane is the seat of a considerable capillary injection, which it is easy to recognize in the larger bronchi, but which can scarcely be appreciated in the bronchi of small calibre; the redness varies from that of a vivid rose colour to a deep red. There can be no mistake upon its inflammatory nature when the subjacent pulmonary tissue is not infiltrated, and when, in those bronchi with cartilaginous rings, it is uniformly as intense over the cartilages as in their intervals. This colouring is not the same in all parts of the bronchial tubes; it is more marked in the bronchi of the inferior tubes, and in the bronchi of the posterior border of the organ. It does not disappear by washing.

We cannot, without fear of falling into error, speak of the changes developed in the consistence and thickness of the mucous membrane. The experiments made on this subject, in order to arrive at a positive result, are perfectly fruitless, and the authors (Barrier, Rilliet and Barthez, &c.) have been, in spite of their great skill in pathological anatomy, obliged to confess their inability to do so.

Bronchial ulcerations are exceedingly rare among children. Dr. Fauvel is, up to the present time, the only one who has reported an incontestable example of it. These ulcerations had a diameter of one to four lines, were of various forms, and occupied the bronchi of medium size; the edges were red, and but slightly raised; the base appeared to be formed by the cellular tissue and by the yellow elastic tissue. They are especially met with in the second period of childhood, in cases of tubercular disease (Barrier). This author also points out, amongst the anatomical lesions of the bronchi, the dilatation of the orifices of the crypts of the mucous membrane, the openings of which much resemble ulcerations of this membrane. These dilated crypts are distinguished from ulcerations by their regular perfectly rounded form, and by the mucus they enclose in their interior. We have never met with anything at all similar in *children at the breast.*

The large bronchi are usually filled by a whitish, viscous, and adherent mucus, containing a greater or less number of air bubbles.

In the small ones a thicker and more opaque liquid is observed, the viscosity of which is sometimes so considerable as to give the appearance of a small false membrane. These liquids may be reddish, bloody, and even entirely purulent. Sometimes small particles of plastic lymph are found mixed with them. Occasionly these form true pseudo-membranous tubular concretions, such as M. Fauvel has remarked in capillary bronchitis. These cases are exceedingly rare.

The duration of the disease rather frequently determines an alteration in the calibre of the bronchi. A more or less considerable dilatation takes place in these tubes, which operates upon their whole length or upon a single point of their extent. In the first case the bronchi are dilated in their course even to the surface of the lung, and remain gaping after the section of this organ. In the other case the bronchial extremities are those alone the diameter of which is increased; they form in the midst of the pulmonary tissue a number of spaces of greater or less size, shut in on all sides, lined by a very smooth and delicate membrane, which is interruptedly continuous with the internal membrane of the bronchi.

This dilatation, which only exists in cases of bronchitis of long duration, explains itself very readily on physical principles. It is thought, and with reason, that the presence of mucosities in the bronchial canals affords a considerable obstacle to the return of the air, which thus finds itself imprisoned in the air cells. At each inspiration fresh portions of air have a tendency to add themselves to those which are already included; an incessant compression and dilatation in the bronchial extremities thence results. Such are the rational hypotheses which may be submitted on the production of this phenomena. They are supported by the authority of MM. Rilliet and Barthez, Barrier, Fauvel, and Grisolle.

An alteration is sometimes met with, which, it said, plays an important part in the production of lobular pneumonia, and which M. Fauvel terms vesicular bronchitis. It is characterized by the presence, in the midst of the lung, which remains soft and permeable, of a great number of greyish vesicles, filled with air and mucus, resembling, in their exterior aspect, semi-transparent tubercular granulations. This alteration is more common among children from two to five years than in those which are still at the mother's breast. When we have met with the vesicles among these last they accompanied a chronic bronchitis occasioned by the presence of tubercles. Each of these vesicles enclosed a tubercular granulation attached to its wall. The alteration which, on the contrary, appears to me to indicate the anatomical passage of vesicular bronchitis to the inflammation of the lobule, presents itself under the form of small reddish miliary points, already hard, resembling ecchymoses, the centre of which is occupied

by a black spot, or sometimes by a grey stain, without a vesicle, and which may be confounded with tubercular granulation. This alteration is very frequent among young children, and it always presents the same characters; they are well known to the medical world.

The parenchyma of the lung, although congested, presents its natural condition in the midst of ordinary bronchitis, that is to say, of that of the larger bronchi. In general bronchitis, extending to the capillary bronchi, the ecchymotic stains of which we have just spoken are *always* observed, united with a greater or less quantity of patches of congestion and of lobular pneumonia. At this stage there is no simple generalized bronchitis, the morbid state is at least double, and is constantly related to inflammation of the bronchi and to inflammation of the tissue of the lung. This last closely follows the development of the bronchial inflammation, of which it is the consequence. The observation of this fact justifies the title of *broncho-pneumonia*, employed by some authors to designate the disease we are now considering.

Emphysema of the lung never exists as a complication of partial bronchitis. It only exists in the cases of general bronchitis and in connection with lobular pneumonia. This emphysema presents itself like that of pneumonia (see the chapter on this subject) under the interlobular, and rarely under the vesicular form. It is sometimes very considerable.

Lesions of Chronic Bronchitis.

The alterations of chronic bronchitis are chiefly developed on the calibre of the bronchi. These canals are the seat of a more or less considerable dilatation, which presents the same characters as those we have previously pointed out. When the dilatation is partial, sometimes excavations result from it sufficiently large to occasion phenomena of auscultation, similar to those furnished by tubercular cavities, and sometimes to such an extent that often any diagnosis between them become impossible.

Symptoms.

The bronchitis of children at the breast presents itself with a symptomatic expression quite different from that of other children of more advanced age. From the period of birth to the end of suckling, and even during some years after, this disease presents very considerable difficulties in the diagnosis. There is only one method of surmounting them, by separately describing simple bronchitis and general bronchitis, the first easily characterized, the second, which must be confounded with lobular pneumonia, of which it constitutes the first stage.

Simple bronchitis. It is this to which the name of cold and catarrh must be reserved. It is accompanied by a small number of symptoms easily recognized and constant in their manifestation.

After a slight febrile attack, which often escapes observation, the young child coughs; and this is the first symptom which attracts the attention of the parents. This cough is usually dry, and, by exception, composed of numerous fits of short duration, without any special character. Then it becomes moist, thick, and the fits of cough disappear. There is no expectoration at this age.

The face preserves its natural expression, with the exception, however, of a little languor and weakness of the eyes. It does not present any extraordinary colour.

The respiration is always slightly accelerated, but without modification of the external respiratory phenomena. These movements are accomplished a little more quickly; but without jerking, without perversion of rhythm, without considerable muscular efforts, and without convulsive agitation of the nostrils.

The resonance of the thorax is not at all modified. Auscultation reveals, at the commencement, on both sides, the presence of sibilant, sonorous, snoring, râles: at a more advanced stage the same râles, to which the mucous râle, either dry or humid, becomes added.

The temper of the child is not sensibly modified; the appetite is not lost; there is no vomiting nor diarrhœa; the mouth is not dry; and yet there is a slight fever. The pulse is a little more frequent than in the normal state, and presents a slight acceleration on the approach of night. At this time the skin, which was without heat, becomes burning, and remains in this state until the pulse has slightly fallen.

Such are the unequivocal symptoms of bronchitis of the larger air tubes, so that partial bronchitis can hardly ever be mistaken. The same is not the case with general bronchitis.

General bronchitis: capillary bronchitis. This variety, which it would be much better to call, with Seifert, broncho-pneumonia, is nearly always preceded by partial bronchitis. It is very rarely observed to originate primarily. I have, however, met with three cases. Then, a modification in the symptoms, previously cited, is observed. The cough is, perhaps, more sharp, more distressing, and more frequent. The countenance is anxious, usually pale; the eyes are injected; and there is, sometimes, swelling of the eyelids.

The respiration is considerably accelerated; sometimes panting like that of an animal which has just been running. It is repeated from thirty to forty times a minute; and is effected by means of strong contractions of the diaphragm, which cause the projection of the abdomen, and the constriction of the base of the lung. It is not even necessary to uncover the child to appreciate these characteristics, which always coincide with a slight antero-posterior movement of the head, and with repeated agitation of the nostrils. It is sufficient, then, to

study the disturbance of the respiratory muscles of the face, to understand those of the muscles of the abdomen and those of the respiratory movements. By the inspection of the nostrils, also, the frequency of the respiration may be recognized — each movement of dilatation corresponding with a respiratory effort.

The resonance of the thorax is not more modified by general bronchitis than it is by partial bronchitis. It is always the same, that is to say, obscure as among all young children.

The modifications of the respiratory sound, as ascertained by auscultation, are more numerous and more complex. To the abnormal bruits developed in the larger bronchi, must be added those which are produced in the smaller ones. Thence result various sounds which cannot be always appreciated, for the strong bruits mask the more feeble ones. Thus, when the mucous râle and the subcrepitant râle are produced at the same time, a very usual circumstance, the mucous râle can alone be well distinguished.

The natural respiratory sound is slightly lessened in general bronchitis; it possesses little fulness; it is, as it were, under some sort of constraint — smothered; in consequence of the pulmonary congestion, or of a deeply-seated pain, not to appreciated by the physician.

The râles developed in the chest are numerous. The sibilant, sonorous, and snoring râles are rather rare; still they occasionally manifest themselves in the course of the day. The mucous râle is much more frequent, and is observed in both sides of the chest; it is, sometimes, more marked on one side than another. It presents itself under the various types of mucous crackling; humid râle, with great bubbles, either rounded or unequal; the dry râle, with smaller and more distinct bursting. It is produced in the two periods of the respiratory movements, and especially at the moment of inspiration. It lasts from the invasion of the disease to its decline; but is a little marked when the disease is fully established. It is inconstant and fugitive. It disappears after an effort, as a violent shaking from cough, to be replaced by the subcrepitant râle, or even by the natural respiration, and it returns a short time afterwards with its primary characters.

This instability of the bruits, furnished by the auscultation of children at the breast, is an important circumstance to beware of, and has not yet been pointed out. It is, in some manner, peculiar to this form of bronchitis, and may serve to ensure the diagnosis.

The subcrepitant râle presents the same variations as the mucous râle, with regard to the number, volume, and dryness of its bubbles. This râle is constant in general bronchitis; it indicates the extension of the inflammation to the extreme ramifications of the bronchi; it points out the insensible passage of capillary bronchitis to lobular

pneumonia, or broncho-pneumonia, which will be described in the following chapter. It scarcely ever exists, except at the posterior part and base of the two lungs. It rarely extends to the summit of these organs: a fit of coughing deranges it, and modifies its tone. It is observed in both periods of respiration; but it is usually more numerous in expiration. There are a great number of cases, on the contrary, in which this râle is more dry and marked in inspiration; it is when the rhythm of the respiration is reversed, and when the active respiratory effort commences the series of respiratory movements. Every one can form an idea of the phenomenon of which I speak, by making, in succession, several abrupt expirations immediately followed by an inspiratory movement. As a general rule, the subcrepitant râle is always more numerous in the passive respiratory movement.

This bruit is sometimes mixed with the mucous râle which masks it for a few moments, and which permits its being heard as soon as a fit of cough causes the removal of the bronchial mucosities.

The general symptoms are here more severe than in partial bronchitis. The restlessness, the ill humour, the agitation, the constant complaints of the child, betray this very unusual irritability. The mouth remains moist, sometimes a little hot; the tongue becomes whitish; the thirst is never very considerable. Neither vomitings nor immediate abdominal derangements are observed. The skin preserves a moderate temperature, and becomes burning once or twice a day during an indeterminate lapse of time. The pulse varies from 130 to 180 pulsations; its frequency is more considerable during the increase of the cutaneous temperature, but the number which specifies their frequency has no relation at all with the increase of the general heat of the skin.

Progress—Duration—Terminations.

The bronchitis which is developed as a primary disease among children, does not sensibly differ from the secondary bronchitis which comes on during the course of eruptive fevers and of other diseases of infancy. It is in no way modified by the presence of these diseases. Its characters are always the same, and its progress is not at all disturbed by them. What we have now to say, applies equally to primary and secondary bronchitis.

The simple, partial bronchitis, passes through its stages in a tolerably uniform manner. The symptoms which have been described are at first but slightly marked, they increase for some days and disappear rather quickly, without leaving traces of their existence. They continue during a variable time, limited from two to three weeks. If they are prolonged a greater length of time, and if, moreover, the fever has disappeared, there is reason to suppose that the disease is transformed into chronic bronchitis, which sometimes

occurs. Usually it terminates by resolution; in other cases, it increases and gives place to general bronchitis.

If this variety often succeeds simple bronchitis, it must not be supposed that it is always thus. There are cases, and we have cited them, in which it primarily appears as general bronchitis. It is characterized by fever, acceleration of the respiration, external derangement of the respiratory movements, cough, and the subcrepitant râle in both sides of the chest. These symptoms disappear sometimes in a few hours after their manifestation; but more constantly, not to say always, they are prolonged during several days at least, during a week at most. If they diminish in intensity, the mucous râle appears as a continuous phenomenon, and resolution soon takes place. If, on the contrary, they are aggravated, we may predict the passage of the disease to the condition of broncho-pneumonia, or confluent lobular pneumonia, indicated by the subcrepitant râle, mixed with bronchial respiration, and the resounding of the cry. General, or capillary bronchitis, lasts from two days to a week; it rarely terminates by resolution, and immediately passes into the state of lobular pneumonia, a disease, the great importance of which, we shall hasten to consider. It is observed, but very seldom, in the chronic state, and is then related to the presence of tubercles in the lungs.

Diagnosis.

Nothing is more easy to recognize than bronchitis, which cannot be confounded with any other disease. It is easily distinguished from hooping cough, the spasmodic cough of which, intermixed with the sonorous hoop, is quite peculiar from general bronchitis and pneumonia by the difference of the râles of respiration.

The diagnosis of general bronchitis is far from being so easy. This disease so much resembles the symptoms of lobular pneumonia, that, according to most authors, all distinction is impossible. There is, often, only a difference in degree between them; the one succeeds the other. It remains for us to investigate if the symptomatology is really insufficient for the diagnosis of these two morbid states, and if symptoms cannot be discovered which may cause them to be recognized, as some have been found for example, to specify the first and second degree of pneumonia in the adult.

The signs furnished by auscultation and percussion are precisely similar in general bronchitis and in lobular pneumonia. They must not be relied upon in order to arrive at a precise diagnosis. Those which are furnished by the study of the cough, the fever, and the greater part of the symptoms which we have pointed out, are absolutely the same. These phenomena are common to the two diseases, they cannot conduce to the required result.

This is more easily obtained by the attentive examination of the external derangements developed in the respiratory movements. In the child at the breast, these derangements become valuable signs in the diagnosis of diseases of the lung. Their study has been too much neglected, and consequently even their importance has been misunderstood.

In the bronchitis which becomes generalized, the respiration is frequent, abdominal, without constriction of the base of the thorax and without movement of the nostrils. When the ultimate ramifications of the bronchi are invaded and when the nuclei of lobular pneumonia are about to be formed, the respiration changes its character; it presents those which have been indicated under the head of *symptoms*. It is panting, with constriction of the chest, depression of the thyroidean cavity, projection of the abdomen and rapid contraction of the nostrils.

In well confirmed pneumonia, on the contrary, the respiration is inverted in its rhythm, it is jerking, groaning, like that of an adult who utters a rapid deep sigh immediately followed by a quick inspiration. This is what I have termed *expiratory* respiration.

Post mortem examinations demonstrate in the most evident manner the intimate relation which exists between the external respiratory derangements and lobular pneumonia. These signs announce in a very constant manner the inflammation of the parenchyma of the lung. All the importance they merit must therefore be assigned to them, for they constitute one of the best characteristics of this morbid state. They are met with in the course of general bronchitis from the time when several pulmonary lobules are attacked by the disease. They indicate the period of passage between the inflammation of the smaller bronchi and the pulmonary inflammation, as the bronchial respiration which follows the subcrepitant râle announces the transition of the first to the second degree of general lobular pneumonia.

Thus, then, although it may be very difficult to recognize in young children, by means of auscultation and by the examination of the general symptoms, the general bronchitis which may be termed bronchitis *a maxima*, from discrete lobular pneumonia, pneumonia *a minima*, there is reason to suppose that the latter exists when the external respiratory derangements above indicated make their appearance. To this extent, general bronchitis may be separated from pulmonary inflammation.

[Capillary bronchitis in some respects presents symptoms not very distinct from those of croup. The distinctive signs and symptoms are given in the following table:

Croup.	Capillary Bronchitis.
Dyspnœa in more or less marked paroxysms.	Continuous intense dyspnœa.
Whistling inspiration; respiration laboured.	Inspiration somewhat stertorous; respiration very short, rapid, and panting.
Voice almost gone.	Voice not altered.
Expectoration of false membrane in the form of a large tube, more frequently in shreds.	Expectoration of ramifying false membranes. (This does not often occur, but when it does it is decisive.)
On auscultation we hear whistling or hissing respiration, and a weak respiratory murmur.	On auscultation we have mucous and sonorous *râles*, often extending over a large part of the chest.

Valleix, *Op. Cit.*—P.H.B.]

Complications.

The bronchitis of children at the breast presents few complications. As such may be pointed out—hooping cough, easily recognized by its special cough; lobular pneumonia which is often a consequence of it; and lastly the fibro-plastic pulmonary granulations and tuberculization; but this phenomenon, admitted by some authors, is not generally recognized. But, on the other hand, bronchitis complicates most of the diseases of the young child. It is very frequent in the course of the eruptive fevers and especially in the course of measles. Its development presents the most intimate relation with that of this disease.

Prognosis.

Bronchitis is much more serious amongst children at the breast and amongst those who have not yet attained the age of five years than at any other period of childhood. Up to this time the passage of bronchitis to the state of lobular pneumonia is very easy. After this period the transition is more rare.

Simple bronchitis is an unimportant and trivial disease, but which however must not be neglected, lest the inflammation become general. It never determines death.

General bronchitis is a much more serious disease. It leads in an almost invariable manner to the development of lobular pneumonia and the prognostic consequences of this disease. It sometimes occasions death by asphyxia, without one being able justly to attribute this fatal termination to some scattered diseased lobules in the tissue of the lung.

The general bronchitis which follows partial bronchitis, is less serious, other things being equal, than the inflammation which is at once developed in the whole bronchial ramifications. In the latter case it is less easy to control the progress of the inflammation. Death is often the consequence of it.

Secondary bronchitis and primary bronchitis present some difference in relation to the prognosis. They are not so evident as might be imagined. There are a great number of cases of secondary bronchitis, the progress and the termination of which do not appear to be modified by the primary disease, and the prognosis of which is the same as that of the cases of primary bronchitis. In other circumstances when the bronchitis is developed in an enfeebled child, attacked by a chronic disease, it presents a danger quite peculiar to itself. Resolution is with difficulty obtained; the transition to the chronic state or to the state of lobular pneumonia is much more common. Active treatment cannot be employed, by reason of the weakness of the child, in consequence of the slight power of reaction it possesses. The disease progresses, and death is the consequence.

Treatment.

The treatment of acute bronchitis is subordinate to a great number of special causes, of all the value of which every one should be previously aware. It is not and cannot be always the same. The appropriate means for the treatment of the primary inflammation of the bronchi, with considerable febrile reaction, do not resemble those which are employed in the same variety of bronchitis without reactionary phenomena. Regard must be had to the circumstances in which the disease develops itself, and it should be ascertained before the commencement of the treatment, if the bronchitis is primary or if its appearance has taken place secondarily to that of another disease. In these cases the natural strength of the child must be taken into consideration, and the state of weakness into which it may be thrown by the primary disease. If this study does not lead to the use of absolutely different medicines, it may at least serve to proportion their energy to the intensity of the evil and to the form in which it appears.

Simple bronchitis usually presents little importance; it often ceases in a few days, and disappears without the assistance of medicine. The parents should be enjoined scrupulously to observe ordinary hygienic laws, so that the child be placed in the midst of a warm and agreeable atmosphere, and be sheltered from cold by means of warmer clothing than that which it is customary for it to wear. It is necessary that it should not be over dressed, which determines abundant perspirations, which may fatigue it, and occasion on the surface of the skin those vesicular eruptions which sometimes afford so much uneasiness to mothers. The use of warm, demulcent, and pectoral drinks may then be prescribed, such as the infusion of mallow flowers and violets, of mullein, or the decoction of rich figs, of dates, or of jujubes, &c., sweetened and perfumed with sugar, syrup of gum, balsamic syrup of tolu, &c. In children at the breast it is seldom necessary to employ

those ptisans, for which they have a certain repugnance. They are made to take them more easily by their mixture with milk, flavoured by some drops of orange flower water. Nevertheless, they must be presented, if it is only to satisfy those very general prejudices which should always be respected, if they are not injurious, on account of the moral support which they afford to those who believe in them.

If the disease is prolonged, in some cases, when the state of the digestive tube does not contraindicate it, the use of mild purgatives may be recommended, such as oil of sweet almonds ℥ vi to ℥ i; calomel, half, three quarters, to one and a half grains; manna dissolved in milk, in the dose of ℥ iss to ℥ iiss; syrup of chicory, in the dose of ℥ vj to ℥ i a day; or Hufeland's powders for infants.

Magnesia	450 grains.
Root of rhubarb	160 grains.
Root of valerian	30 grains.
Sweet oil of fennel	4 drachms.

To make a powder as much as will go on the point of a knife, to be taken once or twice a day.

These means may be advantageously assisted by the employment of common mucilaginous enemata, or of enemata, to which half a teaspoonful of oil of sweet almonds is added.

General bronchitis is much more severe, and requires a much more energetic treatment than the preceding variety. It passes so frequently into the state of lobular pneumonia, that an attempt must be made to arrest its progress, so as to prevent that unfavourable termination. This is obtained by means of the remedies already indicated, united to those which we shall now enumerate.

To the observation of the hygienic measures of which we have spoken must be added the advantages to be derived from warm pectoral drinks and the effect of a strict milk diet. All kinds of boiled meat and soup should be prohibited, and the mother's breast should suffice. To calm the violence of the cough we may advantageously recommend the use of enemata, of mucilaginous drinks, of warm sugared milk mixed with a small quantity of broth, but without the mixture of narcotic substances. If the cough is very obstinate and very distressing this rule may be departed from, and .15 of a grain of the extract of opium, the extract of belladonna, or of datura stramonium, may be added to a mucilaginous drink.

Emollient cataplasms, applied upon the chest, and kept warm by means of gummed taffetas, are rather useful, but it is better to employ dry applications, with compresses of flannel well applied and often renewed. It is right to order irritant pediluvia once or twice a day, composed of hot water saturated with common salt, potash, or ordinary

soap, or in which a small quantity of the cinders of new wood have been placed.

General bronchitis is rarely accompanied by a continued fever sufficiently acute to require the employment of bleeding. Besides, it is known how variable is the febrile reaction of the acute diseases of children at the breast, how it presents intermission in the same subject, and how different it is for the same disease among different subjects. But as it is less in consequence of a preconceived idea on the nature of a disease than from the indications presented by it that the physician directs his treatment, there are necessarily few opportunities of practising bleeding in the disease we are now considering. Bleeding will remain in disfavour with those who would follow the indications furnished by the organism. It is very rarely beneficial to infants, and local abstraction of blood especially so, which possesses the inconvenience of increasing the sensibility of young children, and may throw them into a very serious nervous state.

When the bronchitis presents itself with the usual reactionary symptoms of moderate fever, with quotidian exacerbations, and when the cough is frequent and thick, emetics may be successfully administered. Medicines of this class accomplish a double end. They are antiphlogistics in their way, they depress the vital powers like bleeding, and they diminish febrile reaction. They possess, moreover, the immense advantage of facilitating the expectoration of children by forcing them to such respiratory efforts that the bronchial mucosities are driven out at the same time as the contents of the stomach. They must be always employed when the tracheal bruit of the liquids, contained in the bronchial ramifications, is heard from a distance.

If the local symptoms become aggravated, and if the general phenomena become modified to the extent of causing the great oppression which is characteristic of those external respiratory derangements of which we have spoken, it is much to be feared that the passage of the bronchitis to lobular pneumonia has taken place. There is also everything to lose. There must be no hesitation. The adoption of a revulsive plan of treatment may yet arrest the progress of the symptoms. A flying blister, of the size of the chest, should be applied to the back, or still better to the front of the chest. This means has already been several times successful in my hands; it may be applied without inconvenience; it scarcely occasions a slight acceleration of the febrile disorder. The only accident which can result from it, and which must be taken into consideration, relates to the functions of the bladder. But retention of urine is infinitely more rare in the child at the breast than in the adult, and has no unfavourable consequences. It disappears naturally at the end

of some days. This accident may be prevented by substituting for emp. cantharidis, a blister made with a piece of cloth or linen, moistened with ammoniacal liquid, or by the employment of the following ointment:

Croton oil	ʒ ij.
Lard	ʒ iv.

When the disease is progressing favourably, and proceeds towards resolution, it must be carefully watched, so that we may not be surprised by a relapse. The same hygienic precautions ought to be adopted. The first drinks may be replaced by infusions of hyssop, sage, polygala, iceland moss, &c. If it remains stationary, mild revulsives may then be applied to the chest, a Burgundy pitch plaster, or a large piece of linen spread with diachylon plaster.

The complications which appear in the course of the bronchitis may considerably modify the treatment of this disease.

When the inflammation of the bronchi develops itself in the course of another disease, under the title of an intercurrent disease, or when it is observed to be complicated by a fresh disease, its treatment ought necessarily to be modified. Thus, the bronchitis which passes so rapidly to the state of pneumonia, and that which is complicated by hooping cough, require different remedies adapted to the nature of these diseases. That which is developed in the course of measles, and that which appears in the course of chronic enteritis, cannot be submitted to a similar treatment. In the former case we should observe the progress of the symptoms without interfering by too active a treatment, for the symptoms disappear with the eruption of measles. In the latter, expectation is more dangerous, for then we cannot persist for any length of time in the employment of certain remedies, emetics, for instance, which might aggravate the disease of the intestine. Other circumstances may also lead to some change in the treatment of bronchitis; they are related to the state of the health of the child, to the constitution, and to the susceptibility of its bowels. The particular condition must be estimated so as to include, in the treatment to be followed, a sufficient degree of prudence and reserve.

APHORISMS.

161. A moderate fever, combined with an ordinary cough, announces an acute bronchitis without danger.

162. An acute fever, complicated with cough and panting, indicates a very serious acute bronchitis, about to transform itself into lobular pneumonia.

163. The chronic cough of children leads to granular or tubercular phthisis.

164. The sibilant and snoring râle which accompanies the cough of infants is unattended with danger.

165. The mucous râle of young children is not usually of much importance.

166. The subcrepitant râle of children and infants at the breast always indicates a very serious state of health.

167. The mucous and subcrepitant râles are, in young children, the best indication for the employment of emetics.

CHAPTER II.

ON THE PNEUMONIA OF INFANTS AND CHILDREN AT THE BREAST.

The term *pneumonia* is applied to inflammation of the pulmonary parenchyma.

This disease is greatly modified by age. It presents different characters in the child, the adult, and the aged. The pneumonia of new-born children itself differs from that which appears in the midst of childhood.

If we compare the morbid phenomena which children at the breast, attacked with pneumonia, offer, with those which older children placed in the same position present, it will be observed to appear with similitudes separated by important differences. The anatomical characters are nearly similar in both cases, but with respect to the symptoms, the dissimilarity will be found most complete. Now it is really the symptomatic manifestation of diseases that it concerns us most to recognize, for it is that which gives them their special aspect, and is the guide to the physician in his practice.

Up to the present time little has been done to clear up the study of the pneumonia of children at the breast; and if we except the works of Billard, MM. Valleix* and Trousseau, a complete description of this disease will not be found in other treatises of pathology devoted to childhood.

Division of the Subject.

Pneumonia is a very common disease in the first period of existence. It presents itself under a great number of forms, which it is important to recognize, and of which we shall treat in succession. In the most simple form, the disease is observed in an *acute* state, and runs through its stages like most purely inflammatory diseases. In other cases, on the contrary, it lasts a longer time and passes on to the *chronic* state.

* *Clinique des maladies des enfants nouveau-nés.* Paris, 1838; pp. 40 et seq.

It sometimes commences primarily, independently of any other disease, which is very rare at this age, and constitutes what is called *primary pneumonia*—it is *pure pneumonia*. It appears much more commonly in the course of some other disease amongst children, either as a general complication or as a consequence of bronchitis or of pulmonary tubercles. This constitutes *secondary or consecutive pneumonia*. In this category are included *false pneumonia*, *catarrhal pneumonia*, or *broncho-pneumonia*. Those cases which are more directly allied to the presence of fibro-plastic or tubercular granulations, should be described under the name of *tubercular* and *granular pneumonia*. The pneumonia of children at the breast may also be divided according to the innumerable variety of its anatomical forms, as some authors—MM. Barthez, Legendre, and Bailly, for instance—have done in their researches on the pneumonia of childhood. But this method of proceeding has the great inconvenience of subdividing a subject *ad infinitum*, which, on the contrary, requires to be simplified. Consequently, we shall pass over the anatomical division of the second portion of our table, and reserve it until we consider the pathological lesions of pneumonia.

It will suffice to observe, in this place, that primary pneumonia, very rare in young children, presents itself under the *lobar* form; that consecutive pneumonia always assumes the *lobular* form, which may be divided into *discrete lobular pneumonia* and *confluent lobular pneumonia*.

Causes.

The causes of the pneumonia of young children are *predisposing* and *exciting*. It is very difficult to determine their degree of influence. Too many circumstances concur at once to the same end, for one to discover the value of each in particular. Conjectures justified by observation and by reasoning are all that can be established, but these in no way rest upon a vigorous appreciation. The observations are, then, vague, and but slightly interesting.

Pneumonia in children of a tender age is so much the more frequent the younger the child. It is very common in infants. The greater number of the children who die at the Enfants Trouvés, says M. Valleix, present hepatization of the lungs. This is not the case with those who are older. At the Necker Hospital, for example, out of one hundred and one deaths in the year 1842, twenty-eight only were the result of pneumonia.

This disease is as frequent among boys as among girls. It appears much more often in winter than in summer. Most of our cases have been collected during the months when the temperature is low and the atmosphere damp.

Pneumonia sometimes comes on in the midst of the rudest health,

it appears in a primary manner, this is pure inflammatory pneumonia, which assumes the lobar form; much more commonly it appears in the course of some acute or chronic diseases, which do not prevent its development. It is, then, lobular, discrete, or confluent; and it is described under the name of *consecutive* pneumonia.

Who is not aware of the relations of measles, eruptive fevers, with the disease we are now considering? In this case the pneumonia is *consecutive*. Who has not met with pneumonia as a complication of entero-colitis, thrush, hooping cough, croup, sclerema, convulsions, &c.? Who has not observed it come on amongst children just brought to a hospital, under the influence of dorsal decubitus, or of the improper hygiene to which these creatures are submitted? I shall cite, on this head, the case of a little girl, eight months old, very lively, plump, and in good health, who, having the thigh fractured and confined in an apparatus, was brought to the hospital, and placed on a mattress, from which she did not move. She began to cough; pulmonary congestion was discovered; and, on the fourteenth day, she died from a double confluent lobular pneumonia.

Lastly, if we add to the influences we have just enumerated, those which result from tubercular disease, we shall see that this element very much multiplies the chances of the development of pneumonia. In fact, tubercle acts, on the one hand, as a foreign body, that is to say, as a local irritant; on the other, in virtue of the diathesis to which it owes its appearance.

Lesions and Morbid Productions.

The alterations determined by the pneumonia of infants and of children at the breast, present remarkable characters, which are also observed in the pneumonia of childhood. The inflammation does not occupy the mass of the pulmonary parenchyma; it is first developed here and there in the lobules which constitute it.

Thus, *lobular congestion* and *inflammation of the lobule* are, in the young child, the starting point of nearly all the cases of pneumonia. At first, only a small number of lobules, distant from each other, are affected. This is what is observed in *discrete lobular pneumonia*. At a more advanced stage of the disease, the number of diseased lobules is more considerable, they coalesce into numerous groups. It is evident that the disease is generalized. I designate this anatomical form under the title of *confluent lobular pneumonia*. Lastly, in a small number of cases, *lobar pneumonia* is met with, as in the adult. We must always take care not to mistake, as M. Valleix has done, and describe as lobar, cases of very confluent lobular pneumonia, in which, with a little attention, the eye recognizes, fused and reunited, the elements of lobular pneumonia in the different stages of the disease.

Discrete lobular pneumonia. Partial lobular pneumonia is almost always simultaneously met with on both sides of the chest, since, out of the number of fifty-five cases of pneumonia which I have observed at the Necker Hospital, forty-six were double. The disease always predominates on the right side. It always attacks the inferior lobes, and extends upwards to the base of the middle and superior lobes, an observation which is opposed to the facts observed by M. Valleix. It is also more marked towards the posterior border and the external surface of the lung; the summit is pale, bloodless, affected with intervesicular emphysema, rarely with vesicular emphysema.

On opening the chest, the lungs slightly collapse. They are heavier than in the natural state, and offer little crepitation. Their surface preserves, at the situation of the diseased parts, a granite red tint, which results from the union of a considerable number of reddish spots of different gradations of colour. Each spot represents a lobule, the degree of the congestion of which is different, and corresponds with a more or less considerable partial induration of the pulmonary tissue. The induration is the better characterized in proportion as the spot is deeper in colour. When the surface of the lung is examined by the touch, and these deep nodosities discovered, it might be imagined that tubercular granulations are met with. On the posterior border of the organ, near the apex, a series of transverse and parallel depressions, produced by the pressure of the ribs on a portion of uninflamed pulmonary tissue, are also rather frequently observed. There is no reason for believing, as Broussais would wish, that this deformation is peculiar to pneumonia.

The interior of a lung attacked with discrete lobular pneumonia, presents, under a magnifying glass, a rose coloured surface, sprinkled by a greater or less number of red spots scattered here and there. These spots are of different gradations of colour, and correspond to engorged lobules, which present the following characters: they form a slight projection; their dimension is indeterminate; their aspect smooth or granulated, as in ordinary hepatization, and their density rather great; they no longer crepitate; they are infiltrated by a reddish sanies; they are impermeable to the air, and sink in water, for they possess a greater specific gravity than that of this liquid. If the impermeability is constant during life, it is always in consequence of the imperfect action of the inspiratory muscles; on the dead body, on the contrary, insufflation causes the air to penetrate into all the obstructed cells, revives the rosy colour, and, in part, restores the suppleness of the organ, which floats on water, and becomes crepitant again, as in the natural state.

These facts have been disputed by MM. Legendre, Bailly and Barthez, who have very often practised with variable success, the

insufflation of lungs attacked with *lobular pneumonia*, and who in consequence would separate pneumonia into two affections—one in which the lung cannot be inflated and which would constitute true pneumonia, and the other in which the lung can be easily insufflated, forming catarrhal pneumonia, the simple fœtal condition and the fœtal congestional condition of M. Legendre; the lobular congestion and broncho-pneumonia, on the contrary, of M. Barthez. These authors, assuming for the principal basis of a nosological division the result of pulmonary insufflation, have thus found themselves necessitated to place between bronchitis and pneumonia two or three new pulmonary diseases, which must be described separately; exactly in the same way as other physicians would insinuate a special pleuro-pneumonia between pneumonia and pleurisy. Attempts of this kind have always failed, and such I think should be also the result with regard to the attempt which I am now combating.

In fact it is impossible to form any precise division on the fact of the insufflation or the non-insufflation of lungs attacked with lobular congestion and with pure acute pneumonia; for in the child as in the adult, in lobular pneumonia, as in lobar pneumonia, in the first as in the second and third degree, at the stage of grey hepatization the insufflation of the lung is *often possible*, air may be sent quite to the pulmonary vesicles, and allow the parenchyma to float on water.

I have many times repeated the experiment, and I have nearly always succeeded in insufflating hepatized lungs. In the first stage the parenchyma simply congested, blackish, livid, engorged, became supple, crepitant, and of a fine scarlet red colour.

In the second stage, in the stage of red hepatization, the reddish colour and the crepitation reappeared, the tissue *floated*, but it remained *dense*, and to the eye retained the other characteristics of hepatization. If a section beneath the pleura is observed during the insufflation, the air is seen to arrive in each vesicle, and to form so many small whitish, transparent spots, and then it appears manifest that the insufflated cells are less large by half than the healthy cells; this is a proof of the thickening of their walls by the inflammation.

In the insufflation which is practised on a lung in the third degree of pneumonia, the result is the same, but it is not always obtained. I have only been successful three times. The lung preserves its density; it becomes distended, and crepitates afresh, but very feebly; it floats; the distended vesicles are also observed of less size than the vesicles of healthy parts. The small number of vessels which give a rosy tint to grey hepatization, become of a fine red again; but the grey purulent tint of hepatization remains.

In certain cases of pneumonia with very compact hepatization, the consequence of very adherent fibrinous exudation into the pulmonary

cells, insufflation cannot succeed; but at a more advanced stage, when resolution has commenced and the plasma in the cells is ready to become detached, or even, although there may still be pneumonia with hepatization about to decrease, insufflation is followed by complete success.

In chronic pneumonia insufflation never succeeds. I may here then repeat what I observed in commencing this discussion; in the child as in the adult, the insufflation of the lungs attacked with pneumonia often drives the air as far as the inflamed cells, and thus causes the disappearance of a portion of the characteristics of the inflammation.

It is not then possible to establish, on the anatomical fact of the pulmonary insufflation, a division in the history of pneumonia; and still less to find in it a means of diagnosis between true pneumonia and pulmonary congestion in all its stages. This is an error which time will rectify.

In some circumstances the observer has the opportunity of ascertaining the starting point of the lobular inflammation. There will then be observed beneath the pleura, or in the thickness of the pulmonary tissue, small red miliary spots, rather regular, already hard, resembling ecchymosis, in the midst of which a small black speck of a deeper colour is observed. Sometimes this black spot is replaced by a greyish spot which may be confounded with a nascent tubercle. Observation has completely demonstrated this; these ecchymoses are really instances of vesicular pneumonia by which the engorgement of the whole of a lobule commences.

Nulclei of lobular pneumonia congested to the first or second degree are met with. This is the condition which I have just pointed out. As to the third degree, it is very rare. The lobules are observed slightly softened, they possess a greyish tint mixed with red, and under pressure exude a thick liquid resembling sanguinolent pus.

The formation of abscess of the lung, which belongs to this third stage of pneumonia, scarcely ever takes place in children who have passed the age of two years. It is very rare to meet with it in younger subjects; M. Valleix does not appear to have met with it, for he cited no example of it in his work (*Clinque des nouveau-nés*). MM. Rilliet and Barthez have observed some cases of it, and for my part I have only seen it twice.

In one case, in a child which had neither tubercles nor pneumonia, I observed at the pale, exsanguine summit of the right lung, beneath the pleura, and buried in the pulmonary tissue, three abscesses, distinct from each other, without alteration in the intervening parenchyma. They were as large as a full sized pea, were filled with serous pus, and emptied themselves by rapidly contracting, without permitting the opening of communication with the bronchi to be seen. In no part

was dilatation of these tubes observed. Another time, while making the autopsy of a young child who had died from tubercular peritonitis, I observed in the lungs two abscesses filled with tolerably thick pus; but there still remained adherent to the walls, solid and hard fragments of unsoftened tubercle; so what might have been taken for an abscess was no other than a cavity, the result of the softening of tubercle. There were, besides, three or four small pulmonary tubercles in a crude state, and productions of the same nature in the bronchial glands.

The termination by gangrene is very rare; I have, however, observed it once in a child attacked with pneumonia, who died eight hours after the performance of tracheotomy for croup.

If we investigate, by means of the microscope, the intimate nature of this alteration, it is found to be constituted of very different elements and morbid products. *In the first stage*, in the stage of lobular congestion, a more or less considerable hyperæmia of the wall of the cells of the lung exist in the diseased parts, with serous or albuminous exudation in the *extra vesicular* tissue, and with a collection of fat and pavement epithelium in the cells. *In the second stage*, the same hyperæmia with its extra vesicular exudation and deposit of epithelium exists, combined with granular globules of inflammation and purulent globules in the interior of the cells, that is to say, in the *intra vesicular space*. Thus, we can understand those who pretend to divide pneumonia according to this anatomical disposition into *vesicular pneumonia* and *extra vesicular pneumonia*, but it is a distinction which it would be difficult to push further. Lastly, *in the third stage*, the hyperæmia of the walls of the cells is less apparent, but the collection of mucus and pus globules in the interior is very much more considerable.

Confluent lobular pneumonia. When the alterations which I have just described are developed in a great number of lobules, the extent of the disease gives a different aspect to the lung. In discrete lobular pneumonia, a small number of diseased lobules are observed, surrounded by a large extent of healthy pulmonary parenchyma; here quite the contrary is the case, nearly the whole of the lobe is invaded by the inflammation, in the centre of which rosy lobules are met with in the normal state. As the disease is successively developed in each of the affected lobules, it thence results that they are in different degrees of transformation; and lobular engorgements, in the first, second, and sometimes in the third stage, are observed in the same spot. Sometimes, cases of confluent lobular pneumonia are met with, but of slight extent, which are seated at the circumference of the base of the lobes of the lung. To these, De La Berge has applied the name of *marginal pneumonia.*

In this variety, section of the lung presents an unequal surface, usually smooth, and sometimes dotted over with very minute granulations. It is observed to be sprinkled with reddish violet, or blackish spots, presenting infinite gradations of colour. The tissue is hard, resisting, capable of being insufflated, does not crepitate, and sinks to the bottom of the water. The lobules are infiltrated with blood, or with reddish serum.

When the disease has existed some considerable time, the pathological modifications are different and uniform. All the lobules have arrived at the stage of red transformation, so that the section of the lung, instead of being marble and granite like, as in the preceding variety, presents a smooth, reddish, resisting surface, having the appearance of a homogeneous tissue, resembling compact flesh, the closely packed molecules of which would be but slightly distinct from each other. No granulations are then observed unless it is lacerated, which it is difficult to do, on account of the density of the tissue. The name of *carnification* is given to this state. It is sometimes met with in the adult, in the pneumonia termed typhoid, in secondary pneumonia, in those lungs which are compressed by an effusion, &c.

Lobar pneumonia. Lobar pneumonia, with complete and uniform hepatization of the pulmonary parenchyma, is very rare among children at the breast. This variety of simple pneumonia hardly ever presents itself with the anatomical characters which every one accords to the pure pneumonia of adults. It differs in reality so slightly from confluent lobular pneumonia, that it is right to bring them into close alliance. There is often only a difference of degree between them. The lobe is never entirely invaded; lobules which preserve the suppleness and the rosy grey tint of the natural state are often observed external to the indurated portions. In the diseased parts, lobules are observed, the alterations of which are a little less advanced than those of the neighbouring lobules, as may be still further seen in the cases of M. Valleix, who has neglected to remark this, and who has consequently considered as really lobar, cases of very confluent lobular pneumonia. From this anatomical disposition, alterations of colour and density, which are easily appreciable, result. It furnishes, besides, the most powerful reason that can be brought forward in order to establish that it is often by lobular pneumonia that lobar pneumonia commences.

Chronic pneumonia. This alteration is very rare, and is always present in the lobar condition. It is characterized by a reddish grey induration of the lung, which has lost its spongy character, and presents the smooth and fleshy aspect of carnification. This tissue is very hard, and impermeable to air except by insufflation; it is almost entirely composed of an amorphous, homogeneous substance, interposed

among the elements of the lung, sprinkled with the granular bodies of inflammation, and with numerous elements of fibro-plastic tissue. It often encloses, in addition, miliary granulations, semi-transparent, and very small, which may be taken for tubercular granulations, and which are formed of fibro-plastic elements, or of cells of pavement epithelium, heaped one upon another.

Granular and tubercular pneumonia. Granular or tubercular pneumonia is observed nearly as often as simple pneumonia. We have met with a great number of cases, and at the hospital half of the cases of pneumonia at least are of this nature; those which are granular are infinitely more frequent than those called tubercular. Amongst our fifty-five patients, twenty-five were reported as tubercular; thirty-three having died, in thirteen of them the verification of the diagnosis could be established.

This form of pneumonia manifests itself in a primary manner amongst children apparently in good health; in them the granulations act as foreign bodies which determine in the pulmonary tissue surrounding the congestion, the different changes of the pneumonia, and often, also, the formation of new granulations and tubercles. They die in consequence of pneumonia and rarely from the phthisis, that is to say, from the consequences of the softening of the granulations or of the tubercles, which are hardly ever seen in infants.

The pneumonia which is developed in a child whose lung is granular or tubercular does not always appear on the limits of the accidental productions. Once we have been able to prove this; it affected the lobules situated between the pulmonary granulations, without there being any inflammation in the parenchyma which immediately surrounded them. With the exception of the granulations which constitute the essential character of this variety of pneumonia, the anatomical characters are the same as those which have been described in the paragraph on simple pneumonia. Like simple pneumonia, granular and tubercular pneumonia is nearly always double, and more frequently occupies the base than the summit of the organ.

The granulations are small, hard, projecting from the surface of the lung; they are opaque, semi-transparent, and are formed, according to the examination I have made of them with M. Ch. Robin, of fibro-plastic tissue united with amorphous matter, and with some cells of pavement epithelium. They constitute the special product which Bayle has described in the pathological anatomy of granular phthisis, and which Laennec thought should be allied to true tubercles. M. Ch. Robin has seen some of them which were entirely formed of epithelial cells.

The tubercles, also, present themselves in a miliary state under the form of opaque yellow granulations, of a little larger size and formed by polyhedral cells filled with molecular granulations, without any nucleus

or nucleolus. Tubercular masses are also observed of a considerable size, in a state of crudity and sometimes softened; this fact is uncommon. Twice these tubercles presented a very remarkable disposition, of which the following is the description: The superior and inferior lobes of the lung were sprinkled over by a considerable quantity of semi-transparent vesicles, as large as hemp seeds, projecting under the pleura, distended with air, and enclosing a very small opaque granulation, adhering to one point of the walls; each of these vesicles communicated with one or several small bronchi. The greater number were isolated, but a great many, very close together, had evident communications between them. There were, besides, in the lung, crude tubercles, the alterations of confluent lobular pneumonia, but no inflammation of the bronchi nor dilatation of the bronchial tubes.

[It would appear that M. Bouchut is ignorant of the observations of Jörg when he states that "the pneumonia of children at the period of infancy becomes the more frequent as the period of birth is approached;" and again, "the nuclei of lobular pneumonia are met with engorged to the first and second degree, it is the condition I have just alluded to; as to the third degree, it is very rare;" for this constitutes the *atelectasis* of Jörg, the partially unexpanded lung of early infancy.—(*Die Fötuslunge im gebornen Kinde*, 1835.)

This condition, or the *état fœtal*, consists in a form of pulmonary condensation, in which the affected parts are violet coloured, less voluminous than natural, flaccid, tough, smooth on section, and devoid of granulations (carnification, splenization)—covered by smooth and normal pleura, generally limited abruptly by the interlobular septa (pneumonie lobulaire)—and often seated at the anterior thin margin of the lung (pneumonie marginale); has been often adverted to and independently described by various authors, giving rise to much confusion in the attempt at classification; and it was only when MM. Legendre and Bailly applied the convincing and simple test of insufflation of the lung, that the peculiarities of the so called "lobular pneumonia" and its essential differences from all the well known and recognized types of hepatization became an irresistible conclusion. This experiment was not new; for Jörg, in 1832, proved that the forms of pulmonary condensation, which admitted of being brought back to their normal condition by insufflation, were, in fact, a persistence of the fœtal unexpanded state of the organ. In the case of *new-born* children, in whom alone the experiment had hitherto been tried, there were few if any who had disputed the correctness of this idea, and the distinction between the inflammatory and the non-inflammatory types was in this country and in Germany, perfectly well established for the first periods of infantile life. In France, although the condition called by Jörg *atelectasis*, or imperfect expansion of the lung, was described with remarkable accuracy as early as 1821, in a thesis by Dugés (See *Memoir of Legendre and Bailly in Archiv. Générales de Méd.;* tom. lxiv, p. 76); yet neither his observations on the subject, nor the more complete researches of Jörg, seem to have been generally known and appreciated; and even MM. Legendre and Bailly appear to have worked out their researches upon the état fœtal, as a morbid state supervening after birth, without the advantage of knowing that a method similar to their own had fully established the occurrence of the same state as a congenital condition.

In a paper by Dr. Alderson, on pertussis, published in 1830 (*Med. Chir. Trans.;* vol. xvi), a lesion of the pulmonary parenchyma was commented on, which was said

to differ from the hepatization of "peripneumony." The individual lobules were more dense, of a dull red colour, devoid of air, and sinking instantly in water. Such a condition, too, was found uncomplicated with any evidence of pleuritic inflammation, the lung being dense and contracted, as if the air had been expelled, and the sides of the air cells agglutinated together.

M. Bouchut correctly observes that the hepatized lung can be frequently inflated, but he has overstated the fact from not having accurately distinguished the cases of pure hepatization from the slighter forms of inflammatory lesion combined with collapse of the lung.

The real grounds for distinction in cases of the *état fœtal*, as laid down by Legendre and Bailly, are not merely that the lung can be inflated, but that by inflation it can be brought back to an absolutely normal condition, which can never be the case when any morbid deposit is present in the air cells, or in their walls, as is supposed by M. Bouchut to be the case in the lobular form of pneumonia.

This collapsed condition of the lung is entirely independent of any inflammatory process, and is the result of a return of the lung to its fœtal condition, the vesicles emptying themselves under circumstances of which MM. Bailly and Legendre give a minute description. A portion of lung which has thus become solid, dark, and apparently condensed, will, like that of a child who has never breathed, assume a perfectly natural appearance if inflated. The previous statements of M. Bouchut, to the effect that the second and third degree of hepatization may always be distended with air by insufflation, when it will become crepitant and float on the surface of water, were controverted by MM. Bailly and Legendre; he now allows that lung in the state of grey hepatization cannot always be thus distended. In the case of a simply congested lung, inflation will restore the bright colour and increase the sensation of crepitation, but no such result is produced on lung in a state of inflammatory hepatization. It will be found, as MM. Bailly and Legendre have observed, that in the carnified and fœtal condition of the lung in combination with a congested state of the pulmonary vessels, insufflation will produce exactly those effects described by M. Bouchut; but this state is one very different from true red hepatization, and it would appear that M. Bouchut has not sufficiently distinguished between them.

Dr. Gairdner (*British and Foreign Medico-Chirur. Rev.;* vol. xi, p. 465) thus observes in reference to this subject: "Regarding, then, the physical condition of the lung in the so called 'lobular pneumonia' as clearly established, inasmuch as it is proved, 1st, that this form of condensation has no connection whatever with any of the ordinary types of inflammation or hepatization; 2nd, that it has the closest possible analogy, if not identity of character, with the unexpanded condition of the lung and of the infant just born; let us now proceed to the inquiry as to the true pathological character and rationale of this lesion. MM. Legendre and Bailly indicate the circumstances which favour the development of the *état fœtal*, and with which it is commonly associated. These are—debility, congenital or resulting from disease; prolonged dorsal decubitus; and obstruction of the bronchi by a thick and abundant mucus. Under these conditions the *état fœtal* most frequently occurs; but the direct agencies in the occlusion of the air vesicles are regarded as being, 1st, the natural contractility of the pulmonary air vesicles; and, 2nd, the congestion of their walls, which principally affects the depending portions of the lung, and produces the peculiar form of condensation called by Legendre and Bailly the *état fœtal congestionné.*

MM. Rilliet and Barthez distinguish clearly between the lobar and the lobular pneumonia, considering them as diseases not merely different in situation but in anatomical characters, causation, symptoms, results, and treatment. They regarded

the lobular pneumonia as almost always a secondary disease, connected with bronchitis, and therefore properly distinguished by Seifert's name of broncho-pneumonia; while the lobar pneumonia, or hepatization, was generally a primarily affection of the pulmonary tissue. Moreover, they distinguished some varieties of this affection as identical in character with the carnified lung, described by Laennec as the result of pleuritic compression; they therefore readily adopt in their later memoirs the information furnished by the experiment of insufflation; but deny that the dilatability of the pulmonary tissue is any proof to the contrary—a doctrine to which they have been evidently led by the observation of cases in which the affected lobules are not only collapsed and full of blood, but display a considerable amount of serous infiltration."

In the opinion of Dr. Gairdner, the views of none of these authors afford a satisfactory explanation of the forms of pulmonary condensation under review. "The *état fœtal*, or collapse of the air cells, when occurring in a lung that has been once expanded, is in all probability a secondary lesion, and dependent, in the majority of instances, on a catarrhal condition of the bronchial tubes"—a conclusion which has been arrived at by Fuchs *(Die Bronchitis der Kinder)*. Dr. Gairdner also maintains that the reason of the great liability of the child to pulmonary collapse, as a consequence of bronchial obstruction, is chiefly the want of resistance in the bones of the infantile chest preventing the muscles from acting on individual portions of it with the force necessary, in some cases, to overcome the bronchial obstruction, and in the frequent coexisting debility and dyscrasia which are strong predisponents to the occurence of this lesion.—P.H.B.]

Concomitant Lesions of Pneumonia.

We very frequently meet with interlobular, but scarcely ever with vesicular, emphysema, in connection with pneumonia. The bronchi are obstructed in the majority of cases by mucosities, the plasticity of which is variable, but sometimes so great that they resemble false membranes. Only once have I met with general dilatation of the bronchial tubes. The mucous membrane is nearly always red in the large tubes and in those which correspond to the diseased parts of the parenchyma. The redness is often due to imbibition, for the other characteristics of the inflammation, swelling, softening, ulcerations, &c., are not observed. One of our colleagues, however, M. Fauvel, states that he has discovered bronchial ulcerations in the bronchi of medium calibre; but this was not in a young child, it was in a girl who had attained her eleventh year.

The glands at the root of the bronchi are always swollen, red, and softened; partial or complete tubercular degenerescence is then observed, but it is more rare in cases of simple pneumonia than in cases of tubercular pneumonia.

The pleuræ are covered by a plastic exudation so delicate that it may escape an inattentive observer; they present a reddish colour, and a more or less abundant red dotting; in one case their cavity enclosed a considerable effusion.

We have observed, besides, in several subjects, the friability and sponginess of the osseous tissue, which characterize rachitis; many

alterations of the digestive tube, so common in children at the breast; thrush, entero-colitis, sometimes organic disease of the heart, and, lastly, the alterations which have preceded the appearance of the pneumonia, and we know how frequent consecutive pneumonia is.

In tubercular pneumonia, tubercles are observed scattered in all the organs. In the same subject we have noticed the presence of tubercles beneath the pleura, in the lung, and in the bronchial glands, diaphragm, liver, spleen, mesentery, glands of the neck, temporal bone, and in several parts of the cerebral substance.

Symptoms.

Simple acute pneumonia. The pneumonia of children at the breast presents symptoms rather different from those of the pneumonia of childhood. It is very rarely lobar, and scarcely ever puts on that form which is called pure pneumonia, and the type of which is presented to us in the adult. When this exceptional case presents itself, the commencement is rapid; indicated by a strong fever, or by a convulsion; afterwards followed by cough, and the other phenomena of percussion, auscultation, &c.

Things do not usually occur in this manner. The pneumonia will be lobular, and it commences by a simple bronchial catarrh, with more or less fever. The child is sad, and depressed at times; it takes the breast with less pleasure; cries after the slightest opposition to his wish; and soon a slight fever is observed, cough, and a marked acceleration of the respiratory movements. Auscultation of the chest reveals the presence of the mucous and, sometimes, the subcrepitant râle in both lungs. Percussion only gives negative results.

These symptoms last from twenty-four to forty-eight hours. If they disappear, or if they only remain stationary, the disease is merely a catarrh, which has affected some bronchial vesicles. If they increase, we may seriously fear the development of lobular pneumonia.

The child then becomes restless, sometimes much agitated; discontented at everything, even at the sight of its nurse's breast. The appetite is not disturbed; it does not vomit, and has no diarrhœa. The skin, moderately warm, becomes burning at irregular intervals, and the pulse is accelerated in proportion to the development of the heat.

The cough becomes more frequent, and sometimes returns by fits. The respiration is disturbed, as may be judged by the acceleration or the perturbation of its movements, and by a certain degree of agony depicted on the countenance, expressed by the hurried movements of the nostrils.

In the chest the mucous, subcrepitant, and, sometimes, crepitant râles are heard on both sides; at a much later period, bronchial respiration and bronchophony. Percussion, which up to this time had

only given negative results, demonstrates the existence of dulness at the situation of the diseased parts.

Then, after a variable time, the respiration becomes embarrassed and retarded; the fever persists, and presents marked exacerbations; the child is fretful without shedding tears (Trousseau); the face becomes pale, livid, and cold; the features altered; the pupils dilated, and if the dyspnœa is considerable, the child soon perishes of asphyxia.

If the details of the picture we have endeavoured to paint are well appreciated, it will be observed that pneumonia reveals itself by two sorts of pneumonia, the first entirely exterior, appreciable by all; the others hidden, which are going on in the lung, where they are confused, combined among themselves, difficult to make out, and *nearly* without value by the side of the first.

Of particular Symptoms.

Pain. If the pain of the side, very common in pneumonia, exists in children at the breast, which is possible, it is not easily appreciated. It only manifests itself amongst subjects of a more advanced age, who can already give an account of their sensations, and in whom the respiration is then short, constrained, suddenly suspended in the midst of each inspiration.

Cough. The cough is constant in all subjects. It sometimes presents itself under the form of fits, but without the hoop, as in hooping cough. When the pneumonia supervenes in the course of this disease, it is usual to see the characteristic fits disappear, which are replaced by the ordinary cough. The *expectoration*, which M. Valleix has pointed out as present amongst infants, is rarely met with. We have only once met with the presence of a little reddish sanguinolent froth, situated on the edge of the lips.

Deformity of the chest—disturbance of the respiratory movements. The deformity of the chest is a rare phenomena as an immediate consequence of the acute pneumonia of infants. The diseased side of the chest is sometimes a little dilated. It is, on the contrary, found shrunken when the pneumonia has passed to the chronic state.

The acceleration of the respiratory movements always exists when commencing pneumonia is well established. The movements are increased to sixty and eighty a minute; the respiration is, in other respects, natural, abdominal, without considerable muscular efforts, and without agitation of the nostrils. This extreme acceleration gives it a striking analogy with that of a dog which has just been running. This condition is perfectly expressed by the term of *panting* respiration.

The disturbance of the respiratory movements only exists at a more advanced stage of the disease. In this case, anxiety is depicted on the countenance, the inspiratory muscles of which are in play. The

nostrils are elevated at each inspiration, and the mouth remains gaping. When the respiratory obstruction is extreme, then the muscles of the lips contract in their turn, the commissures being drawn outwards and downwards. This sign is, moreover, one of bad augury, as it is only observed in the last moments of existence. The respiration is less frequent than in the preceding case. It is inverted in its rhythm, commencing by an active and sharp movement of groaning and jerking expiration, followed by a passive inspiration. Each expiration is accompanied by a lateral constriction of the base of the thorax, by a great projection of the abdomen, and by subclavicular and sternal depression. I give to the assemblage of these phenomena, the name of *expiratory respiration.* Let the reader make quick expiratory movement, immediately followed by an inspiration, and he will very well understand what my words are unable to express.

Moreover, these exterior disorders are very well evinced upon the physiognomy of the child, without it being necessary to undress it. The paleness of the face, the movements of the nostrils, the noise that the mouth makes in the expiratory respiration, are sufficient, in a child at the breast, in order to constitute the diagnosis of pneumonia.

M. Jadelot was, then, right in proclaiming the advantage that might be derived from the study of the physiognomy in recognizing the diseases of children. Those are in the wrong who have only exaggerated and distorted his idea.

We must refer to the dyspnœa which this disturbance of the respiratory movements reveals—the swelling of the dorsal veins of the hand. This symptom, pointed out by M. Trousseau, is never more decided than when the dyspnœa is violent.

Percussion. Percussion of the chest, in very young children attacked with pneumonia, is far from being as useful as in the adult; it very often only furnishes uncertain and confused notions. Thus the resonance of the chest is not affected at the commencement of the disease; it is scarcely modified in the lobular pneumonia which tends to become generalized, and it only disappears in very diffused lobular pneumonia, and in lobar pneumonia. With the exception of this last case, the thoracic dulness is never absolute, the two sides of the chest must be comparatively percussed, so as to appreciate a relative dulness at least, which is a very difficult matter.

It must also be observed that in the same child, the sounds which are obtained by percussion increase and diminish alternately with the intensity of each respiratory movement. They increase during inspiration and diminish on the contrary during expiration; they are in relation with the quantity of air contained in the chest. We have already spoken of this phenomenon in our studies on the respiration of infants.—(See Part II, page 109.)

Moreover, in order to account for the nearly negative results furnished by a means so useful as percussion usually is in pneumonia, it must first be admitted, contrary to a received but ill-founded opinion, that the thorax of children of one to two years resounds less perfectly than the chest of adults. Lastly, we must recollect that lobular pneumonia is the principal element of the disease; consequently that the affected parts are surrounded by healthy parenchyma, a physical condition which would prevent the production of the dulness.

Auscultation. We can more directly establish, by the aid of this means of exploration, the *panting* respiration, and the *expiratory* respiration when the rhythm is inverted, and when the plaintive, jerking expiration precedes the inspiration.

Besides, we may appreciate the different râles which correspond to each of the stages which pathological anatomy has established. In discrete lobular pneumonia, the subcrepitant râle is allied to the mucous râle; they exist on both sides of the chest, usually at the base, and are more manifest on one side than another. These bruits change their position, disappear almost completely in a violent fit of cough, and reappear some moments afterwards. The mucous râle soon ceases to be heard, and the subcrepitant râle alone exists. Sometimes loud, unequal, and dry, this bruit becomes feeble; sometimes fixed in one part of the chest, it may be intermittent, increasing during the efforts which the child makes; so that, for its correct appreciation, it must be auscultated during the moments of calm and agitation. It exists in both periods of respiration, and may be wanting during the expiratory bruit.

The *crepitant* râle does not appear to exist as a symptom of pneumonia of the child at the breast. I have never heard in these young subjects, the fine dry crepitation, with regular and constant bubbles, as is heard in the adult. In some cases I thought I had discovered this type which only lasted a few minutes, and which was replaced by subcrepitation.

In confluent lobular pneumonia, still in the first stage, the signs of auscultation are the same as those I have just pointed out, they are only of greater extent. When the disease has arrived at the second stage, these râles become weaker, persist in the depth of the organ, and become mixed up with *bronchial respiration.*

This bruit replaces the vesicular murmur, and differs much from the same bruit in the adult. There it is rough, strong, whistling, resembling that which is produced by blowing air into a hollow cylinder; here in the child, the souffle is feeble, indistinct, it is, in fact, rather a rough respiration. In some cases, and especially in the cases of tubercular pneumonia, the souffle, or bronchial respiration, is heard almost as distinctly as in the adult.

This bruit is met with during both periods of respiration, but is

much more frequent in expiration. It should be so, since this period constitutes the active part of respiration, and corresponds to the moment in which the air, strongly ejected from the chest, vibrates against the bronchial walls. When the expiration alone is blowing, the inspiration acquires more harshness — has not all its natural elasticity, and is usually accompanied by some bubbles of the subcrepitant râle.

Bronchial respiration indicates then the generalization of the pneumonia; it is also met with in the case of carnification of the lungs, and of chronic pneumonia. I believe this character to be constant; and if I am correct in stating that it has several times escaped me, my own inattention should alone be accused.

To bronchial respiration is related the modification of the voice, which is called *bronchophony*, and which is replaced, in the child at the breast, by the resounding of the cry. The cry takes place during expiration, at the same time as the souffle; it rings in the ear with a more or less considerable force, the intensity of which, like that of bronchial respiration, is in relation with the extent of the carnification.

When the pneumonia progresses towards resolution, the abnormal bruits successively disappear, the souffle becomes each day less strong, it is soon replaced by the subcrepitant râle, to which the mucous râle and vesicular respiration succeed.

I shall not terminate the study of the local symptoms without making mention of an important phenomenon which coincides with the different bruits produced in the interior of the chest, it is the *vibration of the thoracic walls*. Thus, it is detected with the hand, or to express myself more correctly, the hand, applied on the thorax, becomes cognizant of the mucous and subcrepitant râle which is produced in its interior. The cry principally, as Hourmann has pointed out, transmits to the thoracic walls a vibration, the strength of which is in relation with the degree of the hepatization of the lung.

General Symptoms.

The pneumonia of the children at the breast is accompanied in general by slight febrile reaction at the commencement. When the disease is quite confirmed, the circulation becomes accelerated, and contrary to the results indicated by M. Valleix in new-born children, the pulse never presents more frequency than at the approach of a fatal termination. I have seen M. Trousseau reckon *even up to* 220 *pulsations;* but in order to arrive at this result, it is necessary to calculate ten by ten, and to add to the end of each the words twenty, thirty, forty, fifty, which serve as a point of recal, and

allow very quick reckoning, which would not be accomplished if in a quarter of a second we were obliged to count from unity up to fifty-five, pronouncing the name of all the intermediate numbers.

Pneumonia is not always accompanied by a continued febrile reaction from its invasion to the last stage. The continued type is, as is known, very rare. Much more frequently the fever is remittent. It presents at irregular intervals, especially towards the evening, a very marked remission, with great heat of the skin, elevation of the internal temperature, and increase in the frequency of the pulse. In old or chronic pneumonia the reaction is entirely intermittent.

At the commencement of the disease, the heat is of very trifling extent; it is especially developed on the trunk, for the face and the hands are often chilly. It presents alternations of elevation and depression in relation with the type of the fever. On the approach of death, the skin is cold, colourless, livid, and in some cases speckled as in asphyxia.

Cerebral symptoms are rarely observed to accompany simple pneumonia. It is rather in the cases of tubercular pneumonia that contraction, paralysis, and convulsions are met with, which are produced in the majority of cases by the presence of tubercles in the brain. However, in a certain number of patients, the convulsions, which are developed during the last stage of a simple pneumonia, are not related to any alteration of the nervous centres. They are idiopathic.

Granular and tubercular pneumonia. Granular and tubercular pneumonia is especially met with amongst weak children, whose genealogy is suspicious, and who have been nourished by the feeding bottle, or have been weaned too early. They equally present the discrete or confluent lobular form. The subjects are usually predisposed to all diseases; they have frequently had diarrhœa, thrush, or pulmonary catarrhs. Some deformity of the chest is almost invariably observed amongst them. Once attacked by pneumonia, they present symptoms slightly different from those which are furnished by simple pneumonia: thus, for example, we sometimes meet with dulness, on percussion of a lung which contains a certain quantity of tubercles. The râles are the same in these two varieties of pneumonia, and this may be understood, since the alterations which originate them are very nearly the same. When the souffle exists in tubercular pneumonia, it is usually very loud, and might lead to the belief that it was blowing directly into the ear. Lastly, in some cases the rattling and resounding of the cry is heard analogous to pectoriloquy. The children become emaciated, the fever returns by day and night, by irregular accessions, which are accompanied by chills and perspirations. This last phenomenon is only met with in those children who are nearly two years of age.

DIAGNOSIS.

If the pneumonia of children presented itself as it does in the adult, with a series of constant and characteristic symptoms, it would not be difficult to establish the diagnosis; but here the general symptoms are nearly absent at the commencement, and those which percussion and auscultation furnish lose a great part of their value, at first because of the difficulty which is experienced in discovering them, and secondly because the anatomical form of the disease impresses them with too great an instability. Sometimes the disease commences by a convulsion followed by fever, but more usually at the moment of invasion; the child, otherwise in good health, becomes sad, has a slight fever, refuses the breast and commences to cough; we must then, in order to arrive at the diagnosis, proceed by way of elimination. If no angina exists, no looseness which indicates an intestinal disease, no cerebral symptoms, if there are no traces of an eruptive fever on the skin, pneumonia must be feared. In fact, if the fever and the cough remain, auscultation soon demonstrates the presence of mucous and subcrepitant râles, sometimes in one of the sides of the chest, but this fact is as rare as is that of primary pneumonia; sometimes in both sides of the chest, as usually happens. Very often the disease appears in the course of some disease, as hooping cough or measles, and the premonitory symptoms escape notice. The cough alone exists; and if the children are not examined with a great deal of care, the existence of pneumonia is not discovered even when it is very advanced and without remedy. It should be sufficient to be warned, so as not to be taken by surprise by these secondary accidents.

In the case of a child who coughs and appears to have difficulty in breathing; who with a moderate reaction presents a mucous and a fine subcrepitant râle, more or less numerous in the entire extent of the two sides of the chest, and especially at the base of the lungs, what diagnosis must be established? There evidently exists either a bronchitis, or a simple pneumonia, or lastly a tubercular pneumonia.

But this is not a bronchitis of the large tubes, for the subcrepitant râle does not belong to this disease. Is it an inflammation of the capillary bronchi as some authors state? But are not these capillary bronchi the ultimate bronchial ramifications which constitute the lobules of the lungs, as Reissessen has very well pointed out. We must not play upon mere terms; the capillary bronchi constitute the parenchyma of the lung, which is the reason that capillary bronchitis is never met with without also observing vesicular pneumonia, or lobular pneumonia.

The child has then a pneumonia like children at the breast have pneumonia, that is to say that the inflammation is established in some capillary bronchi, in one of the *sinus ampullosos* of Malpighi, and from thence it extends to the whole of the lobule: the subcrepitant râle is

the diagnostic character of this inflammation. On the other hand we meet with children who cough, are feverish, and who present a respiration sometimes pure but more usually accompanied by a mucous and sibilant râle; these have bronchitis. In discrete lobular pneumonia the subcrepitant râle only manifests itself when the pneumonia passes to the state of resolution, it becomes more humid and much resembles the mucous râle, just as in the adult, when the crepitant râle becomes converted into the subcrepitant râle. In confluent lobular pneumonia the diagnosis is more easy, for the disease has lasted some days. To the local symptoms already mentioned, bronchial respiration and sometimes dulness are moreover added to the general symptoms which assume a great intensity, and which alone suffices for the diagnosis; I would mention the dyspnœa, the *expiratory* respiration, the state of agony depicted on the countenance, the movements of the nostrils, the enormous heaving of the abdomen, and the contraction of the base of the chest which takes place at each respiration. These symptoms partly pointed out by Billard, by Rilliet and Barthez, for children from two to five years old, are so constant in children at the breast, that they appear to me worthy of the greatest consideration, and will *always* conduce to a correct diagnosis.

When the pneumonia has advanced to the lobar stage, or to the stage of carnification, decided dulness, bronchial respiration different from that of the adult, resounding of the cry and frequently vibration of the thoracic walls are observed.

Progress—Duration—Terminations.

When a child at the breast becomes attacked with pure acute pneumonia, that is to say, with lobar pneumonia, which is exceedingly rare, the commencement is abrupt, and the characteristic symptoms become rapidly developed. When, on the contrary, the pneumonia is lobular, and we know that it is nearly always so, it is consecutive to catarrh, or to an acute disease; and at first a catarrhal period exists, which lasts from one to four days. The child is dull, without fever, coughs, and has only a sibilant or mucous râle in the chest; then, with the fever, and a little oppression, the subcrepitant râle appears; it is confined to one of the sides of the chest, soon occupies both of them, and extends principally at the base. The dyspnœa and the agitation increase in less than one day according to M. Valleix, and in three at most; then, where the subcrepitation was heard, an uncertain dulness exists, accompanied by bronchial respiration and bronchophony. This new stage is usually fatal, and death, which comes on very rapidly, takes place by asphyxia.

In granular pneumonia, with the exception of the antecedents, the invasion is the same, but the symptoms often present a remission

which tends to lengthen out the disease. Sometimes a temporary cure is obtained; but sooner or later the symptoms reappear, and death takes place by pneumonia, without softening of the tubercles having yet taken place.

When the disease is about to terminate in a fatal manner, the obstruction and frequency of the respiration increase, and the bronchi are filled with mucosities; the pulse becomes feeble and acquires a great rapidity; the skin of the extremities becomes cold, assumes a blue colour like the face; the features are expressive of agony, the nostrils dilate, the *expiratory* respiration changes all at once, and slackens. A respiratory movement, accompanied by a horrible contraction of the face, comes on every five or six seconds; it becomes less and less frequent, until the little creature, which dies of asphyxia, utters its last sigh.

Very frequently, simple acute pneumonia accomplishes its stages rapidly; ten or fifteen days suffice for their entire course, whatever may be the termination of it. If the cure is to take place, the amendment of the symptoms is affected in a rather rapid manner. When the disease passes to the chronic state, and prolongs itself for one and three months, as we have observed it to do, an unfortunate termination must be feared.

Granular pneumonia is observed very rarely to pass to the state of resolution. There is often a remission in the symptoms, and the disease lasts for a very long time, which it is impossible precisely to determine.

The termination of the pneumonia of new-born children, and of those at the breast is, then, much less frequently fatal than was up to the present time believed. Such a frightful mortality, as indicated by M. Valleix, is only observed amongst the "Enfants trouvés," and is explained by the action of the fatal hygienic conditions in which these children are placed. Our observations, collected in the practice at the Necker Hospital, are more reassuring; in fifty-five patients we reckoned thirty-three deaths; twenty-two patients could then leave the hospital. If we deduct from this number thirteen children whose condition was not ameliorated, we shall find nine of them who were perfectly cured. In the town the cures are still infinitely more numerous, and may be reckoned at half of the number of patients.

These results are not such as we should wish to meet with, and are far from being satisfactory; they nevertheless suffice to indicate that, in the pneumonia of children at the breast, resolution is possible, and that, besides, it appears to be in relation with the hygienic conditions in the midst of which the children are placed.

If the passage of the pneumonia to the chronic state is rare in the adult, it is still more so at the period of life we are now studying. Occasionally, in fact, the symptoms of dyspnœa and of fever, the subcrepitation and the bronchial respiration, are observed to diminish

considerably, and to remain a long time with only a moderate degree of intensity. Chronic pneumonia is especially observed after granular and tubercular pneumonia; we have, nevertheless, met with it in two children attacked by simple pneumonia, a fact demonstrated by the autopsy.

This disease is sometimes complicated with pleurisy, and often with bronchitis; and is only in a small number of cases accompanied by cerebral phenomena. On the other hand, it is a complication of most of the other diseases of infancy. I shall not return to this fact, which has been already mentioned in the chapter on the cases of pneumonia.

Prognosis.

Great efforts are not necessary to establish the prognosis of a disease: the anatomical alterations, causes, progress, and termination of which have already been studied. This prognosis is to be evidently deduced from the antecedent descriptions. Thus, pneumonia, so fatal a disease amongst the "*Enfants trouvés*," is evidently less so amongst the infants of the city, and those who are of more advanced age, in proportion as puberty is approached. In 128 new-born infants, and *enfants trouvés*, MM. Valleix and Vernois indicate 127 deaths.* At the Necker Hospital, out of fifty-five children, from some days to two years old, we observed thirty-three deaths.

Lastly, at the hospital for children, in subjects from two to fifteen years, M. Barrier remarked forty-eight deaths in sixty-one patients.†

What gives so much unfavourableness to the prognosis of pneumonia of children at the breast, is that this disease in them is very seldom primary. It almost always appears as a complication in subjects attacked with measles, hooping cough, or of any other disease, and it is known how prejudicial complications of this kind are. The pneumonia is often granular, or, as we have already observed, it is in relation to the tubercular disease, which gives to the disease a still more unfavourable character; all that can be then hoped for is a remission of the symptoms without a definite cure.

There are some symptoms, the prognostic importance of which seems to have attracted the attention of M. Trousseau, who judges very correctly of these kinds of manifestations. The swelling of the veins of the hand for example, which may be compared to the œdema in the adult, coincides with the obstruction to the circulation. According to this physician, this sign is of bad augury when it exists in pneumonia; it shows that the obstacle to hæmatosis is considerable, that is to say, that the alterations of the lung are of great extent.

It is the same with tears; this manifestation of suffering in a child

* *Clinique des maladies des enfants nouveau-nés.* Paris, 1838; p. 40 et seq.

† Barrier, *Des maladies de l'enfance.*

which is well, ceases to appear as soon as it is ill. It cries, but the secretion of tears does not take place; they only reappear when there is a manifest amelioration in the state of the patient. This symptom, then, deserves to be taken into consideration; it exists in all the acute diseases of the child at the breast, and amongst others in pneumonia; but it is no longer met with in chronic diseases.

[A resumè of the symptoms, progress, &c., of two forms of pneumonia is given by Trousseau and Lasegne in *L'Union Medicale;* 1851; No. 115.

Catarrhal (or lobular) pneumonia is a disease as distinct from simple (lobar), as variola is from erythema. This is seen in their respective mortality. Of twenty children who have been admitted in the Hospital Clinique, suffering from *simple* pneumonia, in six months all have recovered; of nearly thirty who were attacked with *catarrhal pneumonia*, not one survived.

Simple pneumonia hardly ever affects a child below two years of age, and rarely those of two to three, but becomes of more and more frequent occurrence as the child approaches adolescence. Its causes and symptoms resemble those of the adult, with some modifications. After twenty-four or thirty-six hours, the souffle and bronchophony can alone be heard; the crepitant râle which is so often observed in the adult when the patient coughs, even when much souffle is present, is hardly ever heard in the child. So afterwards, from day to day, without the crepitation of resolution, the souffle disappears, leaving only a feeble respiration. The progress of the disease is also more rapid than in the adult. In the mild form of the disease, recovery takes place rapidly, and in large proportion; but in its grave form, many cases are lost by any mode of treatment. M. Trousseau generally bleeds the child, gives it an emetic of sulphate of copper, and then a mixture containing Kerme's mineral and extract of digitalis.

Catarrhal pneumonia commences with a catarrh, which rapidly extends to the small bronchi, and then we have numerous and small subcrepitant râles disseminated over both lungs, and especially posteriorly. These *râles* may persist for four, six, eight, or fifteen days, without any *souffle* becoming manifest; but sooner or later we hear a *souffle*, the resonance of the cries or the voice, or at least a prolonged respiratory murmur. While these latter sounds, common to simple and catarrhal pneumonia, are thus manifesting themselves, we find, by the subcrepitant *râles*, that the capillary catarrh is still persisting in the rest of the lung. The disease has extended from the mucous membrane to the parenchyma of the organ. Febrile action is less than in ordinary pneumonia, being predominant at some portions of the day, and entirely ceasing at others; and these alternations for better and worse may continue for fifteen, twenty, or thirty days; the disease being originally a pulmonary catarrh, and partaking of the obstinacy and uncertainty of catarrhal complaints. As more and more of the parenchyma becomes implicated, the fever becomes more continuous and intense from the first, and the lung became rapidly invaded over a great extent, death takes place with great rapidity. The progress of the disease has usually been more rapidly fatal, when it has succeeded to measles, chronic disease of the skin, or laryngitis. All means of treatment that have been tried have proved impotent in hospital practice; but one half may be cured in private practice.

These two affections may be compared with erysipelas and phlegmon. Erysipelas traverses the surface, like catarrh; and when it persists too long, it induces ulcerations of the skin, furuncles, and circumscribed subcutaneous abscess, just as the capillary catarrh induces suppuration of the lobules, little abscesses

of the lungs, and circumscribed pneumonias. Simple pneumonia, on the other hand, progresses like simple phlegmon—violent in its febrile reaction, but terminating abruptly and rapidly.—P.H.B.]

Treatment.

However unfavourable the pneumonia of young children may be, and whatever may be the apparent impotence of treatment with respect to it, the physician should never despair of triumphing over this disease. Failure matters little when it is our endeavour to treat a morbid state by scrupulously fulfilling the most important therapeutical indications.

When a young child presents some of the symptoms which may lead to the suspicion of the existence of an inflammation of the lung, a light emollient infusion or warm pectoral drinks should be prepared and administered. The child should be carefully clothed, to keep in the warmth of the atmosphere which surrounds it, and it should be carried on the arm as frequently as possible; the quantity of aliment should also be slightly decreased.

It should then have foot baths of soap and water, or of water with wood cinders introduced, and demulcent draughts, to which some syrup of poppies may be added, and we should be ready for the most energetic interference.

When decided pneumonia is observed, and has existed some little time, and the presence of febrile symptoms, of cough, and of the subcrepitant râle on both sides of the chest, is apparent, an energetic and revulsive treatment may suspend the progress of the morbid phenomena. The administration of ipecacuanha in the dose of four and a half to six grains, especially in cases of secondary pneumonia and in tubercular pneumonia, is usually followed by the best results. The application of a blister over the whole of the back part of the chest determines a violent cutaneous revulsive irritation, the good effects of which are soon manifested. I have collected, in the practice of M. Trousseau, the history of several children who have been submitted to this treatment at the very commencement of the disease. In one of them the symptoms were immediately arrested; to the subcrepitant and mucous râle of both sides of the chest the mucous râle rapidly succeeded, then the vesicular murmur. The revolution was brought about in three days. It is perhaps better to apply the blister in front of the chest, the same result is obtained as by the blistering of the back; and, moreover, the compression of the wound by the decubitus of the patients is avoided, a compression which always occasions them great pain.

If the pneumonia at its commencement resembles those instances which we have designated under their name of cases of primary pneumonia *(d'emblée)*, and if the febrile reaction is intense, one of the

veins of the fore arm may be opened if the child is known to be of good constitution.

This operation is often difficult, and sometimes even impossible. The application of two leeches to the epigastrium, or to the thighs near to the condyles of the femur, may be substituted. In this region the leech bites may be easily compressed, and hæmorrhage need not be feared. The abstraction of blood should not exceed ℥ iss. It should be repeated according to the indications, and according to the advantageous results produced by the first bleeding.

I have seen it employed at the Necker Hospital. M. Trousseau has twice obtained the most satisfactory results from it. In one case, the child had peri-pneumonia in the second stage, with the groaning, or expiratory respiration, bronchial respiration and bronchophony. All these symptoms disappeared, and the disease was progressing towards resolution, but a relapse took place, and the death of the child was the consequence.

This means is also recommended by Billard and Valleix; it should be employed with the greatest circumspection. The loss of a large quantity of blood may, at this age, determine a state of weakness, from whence very serious convulsions result.—Richard (of Nancy).

Bleeding should be avoided from the period when it is not absolutely indispensable. Its employment soon causes prostration, increases the existing weakness, and favours the engorgement of the small bronchi, to which hypostatic pneumonia nearly always succeeds. It must not be believed that it is absolutely indicated by redness, swelling, alteration of the secretion of a part, that is to say, by the lesions attributed to inflammation. This would be a mistake. We are ignorant of all the conditions favourable to the development of these lesions, and there are cases in which bark is of more use than the abstraction of blood, in effecting their disappearance.*

Besides these important reflections which relate to the treatment of the commencement of the disorder, we must decide what should be the conduct of the physician in the course, and in the more advanced stages of this disease.

We shall discover here, that the action in the preceding therapeutical means is the less powerful over the progress of the morbid phenomena, in proportion as they are older and more diffused. Thus, when the second stage of the pneumonia appears confirmed, when the fever is stronger with remissions towards the evening, when the subcrepitant râle, already of long standing, becomes general, or perhaps united with a bronchial souffle, with bronchophony, is accompanied by the groaning and panting form of respiration, the treatment is often less successful. It is more difficult and more complex.

* Laennec, *Traité de l'auscultation médiate, annotée par Andral.* Paris, 1836; t. i.

What we have observed on bleeding, may suffice to determine the cases in which its employment is necessary.

Emetics, moderately administered, are here of most decided service. Some give them when the obstruction to the bronchi appears to be considerable, with the intention of producing efforts susceptible of communicating to the thorax violent movements of ampliation, which facilitate respiration and the expulsion of mucosities from the bronchi; others, to modify the energy of the circulation, and to arrest the congestion of the pulmonary parenchyma. The former employ ipecacuanha, the debilitating influence of which is very decided; the latter, on the contrary, extol, as in the adult, the use of tartar emetic, a sedative to which they attach the greatest value. The syrup of ipecacuanha should be given in the dose of ℥ j, or the ipecacuanha in powder, in the dose, and in the manner previously indicated; sometimes the tartar emetic is given in a draught in the dose of three fourths of a grain to the ℥ iss of the vehicle, and ℥ iiss of the syrup of poppies, a teaspoonful every quarter of an hour until vomiting is produced; on the second or third vomiting, its use should be suspended, and the remainder of the draught put aside.

This therapeutic method is most advantageously made use of. It seldom fails to produce at least a momentary amelioration. It often arrests the progress of the disease, and the thoracic symptoms disappear under its influence.

We give the preference to the ipecacuanha in powder. The tartar emetic is sometimes followed by serious inconveniences. From the first dose it determines a considerable prostration, a rapid emaciation, a remarkable alteration in the physiognomy, with sinking of the eyes, and its administration cannot be prudently continued. To seek to obtain the tolerance of the medicine would be dangerous; it would be to run the risk of serious consequences which could not be easily removed. If the tolerance of tartar emetic is a usual phenomena in children of advanced age, it is very rare in children at the breast.

This treatment may be combined with bleeding, at least such is the opinion of M. Valleix. This author thus expresses himself: "There is, I believe, too much apprehension on the employment of this means in infants; with respect to the emeto-cathartic effect, it acts nearly as in the adult, that is to say, tolerance is soon established. It appears to me then, that the treatment should be based upon the employment of bleeding and of tartar emetic."

We may also give, in addition, oxysulphuret of antimony, one and a half grain to two grains, or the white oxide of antimony, in doses of three grains; but these means have never appeared to me very efficacious.

At this second stage of pneumonia, blisters are evidently less useful

than in the first stage. Their employment, however, should not be rejected. We may reasonably believe that the revulsive action, brought about in the dermis, is of such a nature as would impede the series of transformations which follow the congestion of the pulmonary lobules. A sufficiently large blister should be prescribed, and applied in front, in such a manner as slightly to cover the two sides of the thorax.

This means is not at all dangerous. It does not produce in the young child, as in the adult, vesical tenesmus and the retention of urine. It is only at a more advanced age that we have the opportunity of observing these symptoms in connection with the bladder.

There are certain cases of pneumonia in which the reaction is very feeble, or nearly entirely wanting. It is thus, perhaps, advantageous to prescribe some aromatic infusions, such as the infusion of sage, melissa, &c., or even quinine in a small dose. This slightly exciting plan of treatment, of which we speak *à priori*, is often successfully employed in adults placed in similar circumstances. It may be useful in a prostrate and enfeebled child, which only requires a little strength and a degree of vitality necessary for the reabsorption of the products accumulated in the pulmonary parenchyma.

Amongst the complications of pneumonia there are few which should seriously occupy our attention. Thus, the slight pleurisy which accompanies this disease disappears under the influence of the treatment of the principal disease. The tubercular productions of the lung and of the bronchial glands, even when they are well developed, can offer no obstacle to the employment of the means of which we have spoken. There is scarcely any disease but entero-colitis which can modify the treatment of pneumonia; we may again state that the presence of this disease is only a contra-indication of tartar emetic, the employment of which may increase the irritation of the digestive canal. The other therapeutical agents may be indifferently employed, without fear of observing the aggravation of the intestinal disease.

APHORISMS.

168. Primary pneumonia which is also called *pneumonia d'emblée*, is rare in children at the breast.

169. Pneumonia usually follows simple bronchitis, or bronchitis complicating fevers, or acute febrile diseases.

170. Primary pneumonia is usually lobar.

171. Consecutive pneumonia is always lobular.

172. Lobular pneumonia is sometimes *discrete*, sometimes *confluent*.

173. The pneumonia of children at the breast is almost always *double*, and usually attacks both lungs.

174. Lobar or lobular pneumonia is observed under two anatomical

forms slightly differing as to structure, these are intra vesicular and extra vesicular pneumonia.

175. Intra vesicular pneumonia, usually primary, leads to congestion and thickening of the walls of the cells of the lung, with the formation of an internal plastic deposit which constitutes the character of red and grey hepatization.

176. Extra vesicular pneumonia, always consecutive, only produces congestion and thickening of the walls of the pulmonary vesicles without fibrinous plastic secretion in the interior of these vesicles.

177. Chronic pneumonia, more common in the infant at the breast than in the adult, is always lobar.

178. Pneumonia often engenders the formation of fibro-plastic miliary granulations in the interior of the cells of the lung, in lymphatic and scrofulous children, or in the issue of parents tainted with scrofula.

179. The development of lobular pneumonia is favoured by the crowding of children in the wards of a hospital.

180. Ordinary and frequent cough, accompanied by fever and anhelation, should make us fearful of an invasion of a pneumonia.

181. Expiratory, groaning, and jerking respiration is a certain sign of the existence of a confluent lobar or lobular pneumonia.

182. Panting respiration, accompanied by a continual movement of the nostrils, is a sign of pneumonia.

183. Dulness of the chest is generally but slightly defined in the pneumonia of children at the breast.

184. When dulness of the chest exists in a young child with a very bad cold, pneumonia should be feared.

185. Dulness confined to one side of the chest, in a young child, rather indicates pleurisy than pneumonia.

186. The subcrepitant râle which accompanies the cough, the fever and anhelation, confirm the diagnosis of confluent lobular pneumonia.

187. Bronchial respiration, which is rare in children at the breast, always belongs to lobar pneumonia, and sometimes to confluent lobular pneumonia.

188. Bronchophony, that is to say, the resounding of the cry, indicates that the pneumonia has arrived at its last stage.

189. The exaggerated vibration of the thoracic walls at the time of the cries indicates pneumonia, whilst their absence, on the contrary, points out the existence of pleurisy with considerable effusion.

190. The acute or moderate fever, at first continued, presents numerous exacerbations in the course of the pneumonia.

191. Primary pneumonia, or *d'emblée*, is less severe than consecutive pneumonia.

192. Pneumonia consecutive to simple pulmonary catarrh is often cured.

193. Pneumonia consecutive to measles, scarlet fever, smallpox, is a very serious disease.

194. The pneumonia of children at the breast is especially a serious disease, in consequence of the complications which precede or follow its development.

195. The pneumonia of children at the breast has a great tendency to pass into the chronic state.

196. The pneumonia which is consecutive to the development of fibro-plastic miliary granulations, or to tubercular granulations, is usually fatal.

197. Expiratory, groaning, and jerking respiration, accompanied by movements of the nostrils, announces that the life of the child is in great danger.

198. The swelling and œdema of the hands or of the feet which comes on in the course of pneumonia indicates an approaching death. (Trousseau.)

199. The return of the secretion of tears, which had been suspended in the attack of pneumonia, is a good augury for its favourable termination.—(Trousseau.)

200. One or two leeches at short intervals, several blisters in front of the chest, and doses of ipecacuanha, are sufficient for the treatment of simple acute pneumonia.

CHAPTER III.

ON PLEURISY.

Intelligimus profecto passionem pleuriticam difficulter pueros incurrere.

CŒLIUS AURELIANUS.

Pleurisy has long been considered as a very rare disease amongst children. This opinion, first mooted in the writings of Cœlius Aurelianus, of Aretæus, Triller, and Morgagni, was adopted by pathologists and transmitted to modern authors. It was, however, modified by some physicians, who, passing from doubt to absolute denial, looked upon the development of pleurisy amongst children as impossible.

Then appeared works of Billard, Constant, Barrier, Rilliet and Barthez, and of C. Baron, in which pleurisy is accorded the position which it ought to occupy in the outlines of pathology. Hundreds of facts demonstrate its existence in the most incontestable manner. According to these authors, the diseases of the pleura are more uncommon in the first years of life than in the rest of childhood, and they are more frequently observed as secondary affections than as primary diseases.

Pleurisy is met with amongst infants and children at the breast. It presents itself under two forms, which it is necessary to distinguish. In the first, which is the rarer form, inflammation of the entire pleura is the only and real cause of the disease, and constitutes *primary* pleurisy. In the second, on the contrary, the pleurisy is nothing more than a *secondary* symptom, and usually is not severe; the lesions of the pleura are very slight, and follow, without being of much importance, a disease previously established. This form is much more common than the preceding; we will term it *secondary* pleurisy.

This last variety is observed in children attacked with acute pneumonia, in the tubercular, and in most of those subjects who die of entero-colitis or of cerebral affections, when the engorgement of the lung has had the time to produce its effects before death. In these cases the pleura encloses a small quantity, perhaps a teaspoonful, of a limpid or yellowish serum, sometimes opaque, but without albuminous shreds. The pleura is a little reddened, without capillary injection, and covered on some parts of its visceral surface by a plastic exudation which is delicate and transparent, and rarely sufficiently thick to be completely opaque. This exudation is usually hardly appreciable; it is more especially observed at the situation of the angles formed by the fissures of the lung; here it is rather thick, of a greyish white colour, and often serves as the means of the agglutination of the two lobes.

We have often had the opportunity of establishing these lesions of the pleura with slight variations in extent, but without any other anatomical character. In sixty-eight *post mortem* examinations we have met with them twenty-three times.

20	Acute pneumonia . .	9	Concomitant pleurisies.
13	Tubercular pneumonia . .	6	,,
19	Entero-colitis . .	5	,,
16	Various diseases . .	3	,,
68		23	

These lesions were only recognized on the dead body. During life they had been masked by the severity of the other symptoms.

They are evidently closely connected with pleurisy, but, as may be observed, they are very different from those which are seen in primary inflammation of the pleura. They ought, then, to be considered in a special manner, and cannot be isolated from the diseases which they complicate.

In this point of view pleurisy is rather frequent amongst children at the breast; but it does not constitute a disease, the invasion, progress, and development of which it is necessary to describe separately. Like all secondary diseases, it only deserves a simple mention.

It has never yet entered one's mind to describe the œdema which accompanies paralysis, nor to describe separately the swelling of the mesenteric glands consecutive to inflammation of the intestine. It is thus with secondary pleurisy amongst children.

Primary pleurisy, from its analogy with that of the adult, deserves to be more attentively considered. It is very seldom met with amongst children, and this more decidedly the case in proportion as the period of birth is approached. This fact justifies the observation of ancient writers: *Intelligimus profecto passionem pleuriticam difficulter pueros incurrere.*

MM. Rilliet and Barthez have only met with it three times in children from one to three years old. M. Barrier has never met with it at this age. I have collected two examples of it in the practice of M. Trousseau; one of the two children was eighteen and the other sixteen months old. This variety of pleurisy presents anatomical characters precisely resembling those of the adult; it is useless to recapitulate them. In the two patients to whom we have just alluded, the lung was compressed against the vertebral column and carnified. The effusion which filled the cavity of the pleura was composed of purulent serum, containing purulent and albuminous flakes. The visceral and parietal pleura was reddened, intensely injected, and covered in its whole extent by a greyish false membrane, thick, very adherent, and roughened on the surface, which remained free.

[West observes that "some writers on diseases of children, indeed, have left pleurisy altogether unnoticed, on account of its supposed extreme rarity in early life; but this opinion is certainly erroneous so far as regards that secondary pleurisy which comes on in the course of pneumonia, and which is almost if not quite as frequent in childhood as in adult age. Acute idiopathic pleurisy, unconnected with pneumonia, or in which the inflammation of the lung bears but a very small proportion to that of the pleura, and is certainly an uncommon affection during the first years of childhood, and as a cause of death its rarity is extreme." In the fifth report of the Registrar General it appears that of seventy-five fatal cases of pleurisy that ocurred in London in 1841, only three or four per cent. took place in children under five years old. West has only on four occasions had the opportunity of observing acute idiopathic pleurisy run a fatal course in children under five years of age; after five years of age, however, the frequency of pleurisy manifestly increases, and during the latter years of childhood it is little, if at all, less frequent than in the adult.—*Op. Cit.*, p. 211.—P.H.B.]

Symptoms.

Primary pleurisy only occupies one side of the chest; it is announced in the young child by a considerable depression of strength, want of appetite, slight cough, and fever. Then the pain of the side comes on (C. Baron), very difficult to appreciate, the seat of which can be discovered by the cries which the child utters when the painful spot is percussed. The cough gradually becomes more frequent, it is small,

dry, sometimes painful and constrained; it preserves this character during the course of the disease. There is no expectoration; the respiration is quickened, becomes panting, as in pneumonia, and soon assumes the jerking character of groaning and expiratory respiration. The countenance remains pale and motionless; the features are often deformed by the contraction of the respiratory muscles of the face and by the agitation of the nostrils, phenomena which are in relation with the frequency of the respiration. With respect to the decubitus, it is nearly useless to mention it, since the children are not at liberty to select it, and remain, imprisoned in their swaddling clothes, in the position in which they are placed.

At the commencement there may be remarked a weakness of the respiratory sound in the affected side, increasing with the effusion which invades the lateral, superior, and anterior parts. Bronchial respiration is then observed; it is not constant, and seems to disappear to return at intervals.

The conditions favourable to the production of this sound have not, however, changed. This momentary disappearance is explained by the inequality of the respiration of children, or is, in consequence of an obstacle offered to the passage of air by the mucosities, accumulated in the bronchi. Thus, in pleurisy, when the forces which concur to inspiration are too feeble, respiration takes place without an abnormal bruit. The same takes place when the mucosities obliterate the principal bronchus of a hepatized lung, or one compressed by an effusion. This portion does not receive the air, and cannot therefore give rise to bronchial respiration.

To this quality of respiration, bronchophony and ægophony must necessarily be referred, which it is scarcely possible to distinguish amongst children at the breast. In the cases of pleurisy with bronchial respiration, the echo of the cry replaces these phenomena; it extends itself to the infra-spinous fossæ, and to the summit of the crest of the scapula. It is intermittent like bronchial respiration, and ceases as soon as the effusion has become too considerable.

When the pleurisy has arrived at this stage, the absence of respiration in the affected side is complete; the bronchial respiration, and the bronchophony, which were previously verified, are no longer heard, and the dulness is complete. The succession of these phenomena should then be sufficient to indicate in a positive manner the presence of a considerable quantity of liquid in the pleura.

Percussion is a means of exploration without value in the diagnosis at the commencement of diseases of the chest in children at the breast, and consequently of little service at the period of the invasion of pleurisy. The reason of this is entirely physiological; we have previously pointed it out, in remarking that the resonance of the

chest of children at this age is so obscure as not to allow the appreciation of a slight modification of its natural state. When the pleurisy is well developed and the quantity of fluid considerable, then on percussion we obtain a dulness which limits the height of the liquid contained in the pleura. In some cases this dulness extends to the entire side of the chest; it then coincides with the complete absence of respiration.

The inspection of the chest does not furnish any important information at the commencement of the pleurisy and even in those cases of pleurisy which rapidly accomplish their stages. But such is not the case when the disease is sufficiently prolonged to allow the formation of a considerable effusion. Then the diseased side dilates; it may acquire as much as .39 inch more in circumference than the other side; the ribs are straightened and the intercostal spaces are scarcely to be perceived. The sternum and the vertebral column undergo a similar change.

Palpation of the thorax suffices, in some cases, to reveal the existence of the pleurisy accompanied by a considerable quantity of effusion. The hand does not appreciate any vibration in the walls of the affected side at the time of the respiration or of the cries. This symptom, pointed out by MM. Taupin, Baron, Rilliet and Barthez, and which M. Trousseau and myself have had opportunities of verifying, appears to me of great value. Its importance is so much the greater as in pneumonia precisely a contrary phenomena is observed. Thus in pneumonia the vibration of the thoracic walls is considerably augmented. Here we possess, then, a valuable differential sign which must be especially attended to, and which absolutely separates acute pleurisy followed by effusion, and inflammation of the pulmonary parenchyma from each other.

Primary pleurisy of children at the breast is observed, like the pleurisy of children of more advanced years, in the acute and in the chronic or latent state.

In the acute form, the invasion is signalized by the cough without it being possible to verify the pain of the side, by any remarkable acceleration of the respiration and by a moderate fever. The child appears oppressed; it sucks less willingly; its temper is sad; its respiration feeble, accompanied by bronchial respiration without râles; percussion gives no results. When the disease is well established, these symptoms persist and become aggravated; the child becomes thin, loses all appetite, and sometimes has diarrhœa; the fever becomes remittant with nocturnal exacerbations; the respiration is more and more embarrassed and becomes panting or expiratory. The cough remains the same. Auscultation reveals the presence of bronchial souffle, and afterwards the complete absence of respiration. Percussion affords a dull sound throughout the whole of the affected side. Palpation does not discover any vibration in the thoracic parietes.

In the chronic or latent form, the febrile reaction is less, there is scarcely any cough, and the external signs of difficult respiration are slightly marked. Auscultation discovers feeble respiration, the bronchial souffle, and lastly, total absence of respiration. The dulness is complete, the vibration of the thoracic walls is destroyed.

At this period acute and chronic pleurisy cannot be distinguished from each other. The symptoms, determined by the presence of a considerable effusion into the cavity of the pleura, are the same, always excepting the intensity of some symptoms, which is always greater in primary acute pleurisy. The dyspnœa is considerable, and asphyxia soon comes on to put an end to the existence of the child.

The primary, acute, or chronic pleurisy of children at the breast, is always a very serious disease, which rarely terminates by resolution, and which often causes death. The two children, of whom we have spoken, died without it being possible to arrest the fatal progress of the disease. The same thing does not happen in children of a more advanced age. The termination is less frequently fatal, as we may assure ourselves on reference to the works of MM. Baron, Barrier, Rilliet and Barthez.

Diagnosis.

Amongst the diseases of infancy, which may possibly be confounded with pleurisy, one alone deserves attention: this is pneumonia. In children at the breast, pneumonia always follows bronchial catarrh; it is characterized by the presence of mucous and subcrepitant râles in both sides of the chest; by bronchial respiration, bronchophony, and a considerable vibration of the thoracic parietes at the time of the cries. Pleurisy, on the contrary, is not accompanied by any râle; the respiration is feeble on one side only; here the souffle is first heard, to which succeeds total absence of respiration, complete dulness, and the absence of all vibration at the time of the cries. Nothing more is required to distinguish clearly these two diseases from each other. We shall pass over in silence that which relates to the diagnosis between pleurisy and pericarditis, hydrothorax, and some other diseases which are so rarely observed in children at the breast.

Causes.

The causes of pleurisy are much the same as those of pneumonia. This disease is indifferently observed in boys and girls; it is more frequent in winter than in summer; it is developed in preference amongst weak and delicate children, which are imperfectly nourished, placed in the hospital in a state of prolonged dorsal decubitus, and in an atmosphere vitiated by the accumulation of patients. Primary pleurisy is exceedingly rare at the period of existence comprised

between the moment of birth and the end of the second year; secondary pleurisy is then very frequently met with. It is observed at the same time as bronchitis, which terminates most of the diseases of the young child, and especially as a complication of acute or of tubercular pneumonia.

Treatment.

What we have to say on the treatment of pleurisy of children at the breast only really applies to cases of primary pleurisy, as we have purposely, on account of their slight importance, put aside cases of secondary pleurisy. It is scarcely possible, at so tender an age, unless there is considerable febrile reaction, to have recourse to the employment of the abstraction of blood. If a case does occur, great precautions must be used, and only one or two leeches should be applied at a time on the diseased side, the physician being at liberty to repeat them if necessary.

Diuretics are not very convenient remedies to administer to a young child; still, in place of the nitrate of potash usually employed, the tincture of squills, or of digitalis, may be made use of. If the urinary diacrisis is not brought on, these medicines have at least the advantage of lessening the force of the circulation, and of calming the febrile reaction. These medicines may be given in a draught.

Lettuce water	℥ iss.
Simple syrup	ʒ vj.
Tincture of digitalis	Gutt. ij to iv.

Purgatives, the employment of which is adopted by Bandelocque, are cited by M. Baron as likely to produce very advantageous results. Manna should be given dissolved in milk, tartar emetic in solution in the dose of one sixteenth of a grain. These are the mildest purgatives, and those most easy of administration.

Cutaneous revulsives have been made use of by a great number of physicians who have given themselves much credit for having employed them. As these practical results especially relate to the pleurisy of the second stage of childhood, we cannot draw decided conclusions as to the efficacy of blisters in the treatment of the pleurisy of children in the cradle. Nevertheless, if we are to judge by analogy, which is, in fact, the only guide of experiments in therapeutics, we must look upon vesication as a very useful resource to bring about the cure of the disease we are now considering.

It is nearly useless to add that the employment of these different means should be seconded by the observations of rules of the strictest hygiene. The child should be placed in a mild atmosphere, equally sheltered from sudden chills and from too high a temperature. It

should be restricted to a rigorous milk diet, and the nurse should often hold it in her arms and walk about with it in the room, without bringing it to the out-door air. These conditions should necessarily vary according to the strength of the patients; there are some which require to be well fed, and this also may be necessary in chronic pleurisy; others should be carried about out of doors in the sun, in order to counteract the cachexia which affects them.

If the progress of the disease has not been impeded, and "if the quantity of the effusion is such as to threaten existence, and if the patient is deprived of every other method of safety" (Trousseau), the operation for empyema must be had recourse to. It has been performed several times with success, by Heyfelder, in children from six to eight years old. It has been also practised by other physicians and by M. Trousseau, who read, at the Academy of Medicine, a very interesting paper, in which the utility of this operation is shown in the most striking manner.* It has not been yet performed in children at the breast, but I do not consider, the indication being urgent, that the age should be considered as a contra-indication to its employment.

[Dr. Archambault (*Archiv. Gén. de Med.;* Juillet, 1853) relates some instructive cases of paracentesis thoracis in children, which occurred in the practice of M. Trousseau, at the Hopital des Enfants Malades.

Case 1. *Excessive pleuritic effusion, dating from eight days; operation; cure.* The patient, a little boy aged four years, had been ill eight days. The illness began with dry cough, oppressed breathing, and slight fever, but without any shivering or pain in the side. When admitted (January 6th, 1852), the breathing was laborious, and seventy in the minute; the pulse one hundred and twenty, and small; the left side of the chest prominent, not taking any part in the respiration, and everywhere dull on percussion, and without respiratory sounds, except immediately underneath the clavicle. The spleen was pushed considerably below the level of the false ribs, and the heart very much to the right of its proper position. The right side of the chest was healthy.

The day following, the respiration being more laborious, the surface dusky and cool, and asphyxia imminent, paracentesis thoracis was performed, under the sanction of MM. Trousseau, Blache, and Guersant, when a pint and half of yellowish transparent fluid was evacuated. Immediately afterwards, the respiration becomes less frequent, the sound on percussion clear, the respiratory murmur audible, and the heart returned to its proper place.

On the 9th, the effusion returned to some extent, and a diuretic mixture with digitalis was ordered. On the day following there was vomiting and much depression, but the dulness diminished.

From the 12th to the 30th the patient progressed favourably, until the lung had recovered its healthy action, and all pleural rubbing had disappeared. Convalescence was retarded by a severe attack of measles, but in the end the child got perfectly well.

Case 2. *Excessive sero-purulent effusion; operation; death.* The patient was a little boy aged two years, whose previous history was not ascertainable. When admitted into the hospital he was in a state of imminent asphyxia; the face pale,

* *Annales de la Chirurgie Française.* Paris, 1844; t. xii, p. 223.

the pulse small and excessively frequent, the respiration sixty-eight in the minute. The left side of the chest was dilated, dull on percussion, and devoid of any kind of respiratory sound or vibration. The heart beat on the right side of the sternum. The left lung exhibited signs of great congestion.

Paracentesis thoracis was performed on June 4th, 1852, at eleven a.m., and thirteen ounces of sero-purulent liquid evacuated. Ten minutes afterwards the symptoms were ameliorated in a marked manner, particularly the restlessness and anxiety. A loud râle became audible through the left side. Still the respiration continued at fifty and fifty-four, and the pulsation at one hundred and thirty-two in the minute.

Between the 5th and 8th the improvement continued, the respiration falling to forty-four, and the pulsation to one hundred and twenty in the minute.

On the 10th a relapse occurred, the effusion became reproduced, and death took place on the 13th.

After death, nine ounces of sero-purulent flaky fluid were found in the left pleura, which pleura was everywhere covered with a thick, flocculent, false membrane. The two inferior thirds of the corresponding lung were carnified and compressed against the vertebral column, the upper third and the other lung were congested and hepatized in several patches.

A third case is mentioned, of a child aged twelve years, who had laboured under hydrothorax for fifteen days, and was cured by this operation.—P.H.B.]

APHORISMS.

201. Acute pleurisy, with effusion of serum, is very rare amongst infants and children at the breast.

202. Complete dulness, confined to one side of the chest in a young child, indicates pleurisy rather than a pneumonia.

203. Dulness of the chest, and absence on palpation of the thoracic vibrations at the time of the cries, announce a pleuritic effusion.

204. Pleuritic effusion in young children is a very serious disease.

205. The pleurisy of young children, which passes from the acute to the chronic state, is fatal.

206. A considerable effusion in a young child should be treated by paracentesis thoracis.

CHAPTER IV.

ON THE PHTHISIS PULMONALIS OF INFANTS AND CHILDREN AT THE BREAST.

We should entertain a very false idea of the phthisis of young children, did we consider it as a diminutive or a reduction of the phthisis of adults. In early childhood, phthisis pulmonalis possesses characters and symptoms which are entirely special; it is only the termination by death which can resemble the phthisis of subjects of a more advanced age.

The phthisis of infants is the result of hereditary influence, improper artificial nourishment, bad quality of the nurse's milk, premature weaning, cold, poverty, and all the debilitating causes which can act directly upon nutrition. It may equally result from an indirect disturbance of nutrition, by the frequent diarrhœas consequent upon bad regimen. It sometimes appears to succeed acute pneumonia, but in this case there is always room for inquiring which of the two affections has preceded the other, if the pneumonia is indeed the primary morbid state, or if it is not itself a secondary affection. For my part, I believe that in many cases, amongst predisposed children, it is the pneumonia which brings on the development of the phthisis; and here I mention a circumstance which I should certainly not state if it referred to the pathology of man. Phthisis is perhaps, then, in the infant, in the granular form, one of the manifestations of hereditary syphilis. This is a new question, which my experience authorizes me to state, if not to accept.

The phthisis of children presents several distinct anatomical forms; which sometimes coexist, and which I have studied with our learned anatomist, M. Ch. Robin. There is the granular phthisis, the element of which is nearly always the *fibro-plastic granulation*, sometimes the *epidermic granulation*, and there is the tubercular phthisis of which tubercule is the principal element. We thus return to the admission of the researches of Bayle, for a time eclipsed by the genius of Laennec, who has prematurely united two products differing slightly in nature, and which should still remain separate.

In *granular phthisis*, the two lungs are more or less filled by miliary, semi-transparent, opaline, shining, pearl-like granulations. These granulations vary in size from a pin's head to a hemp seed. They are surrounded by a reddish vascular zone, to the extent of .04 or .08 of an inch, or, on the other hand, which is more rare, enclosed by healthy parenchyma. They are hard and resisting to the finger. They are unequally scattered, but without a decided preference for the apex of the lungs, as is observed in true tubercular pneumonia.

These granulations are composed of particular elements, sometimes of fibro-plastic tissue, sometimes of epithelial cells, but this is exceptional. Under this form they remain a long time, and amongst the children who die, there are sometimes no other foreign bodies in the pulmonary parenchyma but the granulations which I have mentioned. Amongst other subjects, they are interspersed in the same lung with tubercular granulations so that the two alterations coexist in the same child.

The following is the microscopical analysis of these granulations drawn up by M. Ch. Robin himself:

Fibro-plastic granulations. The constituent elements of these granulations are—1st, fibro-plastic elements; 2nd, amorphous matter

interspersed with molecular granulations; 3rd, fibres of cellular tissue, generally very rare, and which may be entirely absent, elastic elements of the lung, which are still more frequently wanting; 4th, here and there cells of pulmonary epithelium.

1. The fibro-plastic elements here present themselves in their three varieties—nuclei, cells, and fusiform fibres. The nuclei are the most numerous, and may be ovoid with their characteristic forms; some of them are spherical and smaller than the ordinary nuclei. The cells are less numerous than the nuclei, and are generally ovoid; some have prolongations of their outline, which render them irregular; they enclose a characteristic ovoid nucleus; some may contain a spherical nucleus similar to those to which we have just referred. It is not uncommon to discover cells possessing two nuclei, a circumstance more frequent in this state of the lung than in the fibro-plastic productions. The granulations included in the fibro-plastic cells are always very minute and uniformly distributed, and thus this variety of the elements always presents a considerable transparence. The fusiform fibres are less numerous than the preceding elements, they are pale and transparent, slightly granular, of variable length, some of them being short like those of the granulations of peritonitis and of chronic pleurisy. It is not uncommon to meet with them having the extremity truncated close to the nucleus. This last is generally ovoid, but sometimes it is observed of a spherical form.

2. The amorphous matter is rather abundant, and presents a variable consistence, more marked in the small than in the large granulations; it is sprinkled with minute greyish molecular granules, of indeterminable outline, so as to be amorphous. In some granulations the mass of this amorphous matter encroaches on the proportion of the other elements. Some of them are black, like pigment granules. This substance is important in consequence of its density, which very much prevents the separation of the other elements.

3. The fibres of cellular tissue are often absent; when they exist they are united with the above mentioned elements. Fibres of yellow elastic tissue more frequently exist than those of cellular tissue.

4. The pulmonary epithelium cells preserve their normal aspect, and sometimes present vibratile ciliæ, which are derived from the sides of the small bronchi not yet destroyed by the fibro-plastic deposit.

Epidermic granulations. M. Ch. Robin has only observed granulations of this kind four times; twice in children from four to five years old, twice in the adult. In the two young subjects, granulations of the size of a pin's head to that of a pea were found scattered throughout the whole extent of the lungs. Separated from each other by about .4 to .8 of an inch, they were difficult to crush, presenting a considerable consistence and a peculiar friability. These

granulations projected on the incision of the lung; their distinct outline was surrounded by vascular pulmonary tissue; they presented a grey pearl colour approaching a dull white; they were homogeneous in their whole thickness, and their substance expanded in water, like starch becomes swollen in alcohol.

They were composed of the elements of pulmonary epithelium, of cells having a flattened appearance, generally of from four to five sides, otherwise of variable dimensions, but possessing considerable regularity. These cells, nearly quadrilateral, assumed a flattened form, and were ordinarily mixed with cells which, in the normal state, were of a characteristic cylindrical form. The diameter of these cells varied between fifteen and eighteen thousandths of a millimeter, which is one half less than that of the mucous or cutaneous pavement epithelium. Molecular granulations, presenting nothing unusual, were observed mingled with these elements of epithelium.

In the two other cases remarked in the adult, granulations analogous to the preceding were found distributed in the two lungs, and more abundantly in the inferior lobes than in the superior. Some were confluent, others isolated by about .4 of an inch of pulmonary tissue. From this disposition a particular riddled appearance resulted. Their size varied from a pin's head to that of a large pea. The largest ones were the softest, some appeared softened like what is observed in epidemic tumours of the face. They were of a greyish white colour. Portions which could be easily crushed were observed, and they were composed of irregular cells of epithelium; the molecular granulations were very abundant in all these cells, which contained spherical or slightly ovoid nuclei. Some, but very few, had yellowish grey molecular granulations around the nucleus.

Around these epidermic and fibro-plastic granulations the special alterations of lobular, discrete, or confluent acute or chronic pneumonia, according to the nature of the attack which has terminated the existence of the children, are often observed.

The bronchial glands are always hypertrophied, and they often enclose tubercular matter.

The pleura sometimes presents on its surface small delicate pseudo-membranous deposits, or, more rarely, fibro-plastic intra-pleural granulations.

The liver, kidneys, and peritoneum sometimes present similar changes.

[Dr. Sieveking states that the intra vesicular characters of the deposit were satisfactorily and distinctly exhibited in the case of a child in whom an attack of acute tuberculariza tion of the lungs supervened upon rheumatic heart disease and central cerebral softening; he is not prepared to assert that the tubercular deposit is never interstitial, but is inclined to believe that it is never primarily so; and his investigations have led him to the belief independently of any preconceived theory that

it is never effected without those local and molecular changes in the vascular system which are characteristic of inflammatory action, marked on the one hand by enlargement and congestion of the small vessels, on the other by formation of exudative matter in the shape of aggregation corpuscles, or definite exudation cells; but while these forms are found surrounding the tubercular deposit, they are in no way identical with it.—(*British and Foreign Med. Chir. Rev.*)—P.H.B.]

In tubercular phthisis, both lungs also present miliary, whitish, opaque, sometimes yellowish granulations, scattered here and there in the different lobes, but more usually in the superior lobes. The granulations are the size of a millet or hemp seed, and even acquire that of a cherry kernel. Then there can be no doubt as to the nature of the accidental product; it is decided tubercle with all its other characters. Moreover, microscopical analysis readily permits its verification.

In infants these tubercles very seldom attain a larger size than that I have pointed out; they are seldom observed softened; the lungs are seldom perforated by cavities, which singularly modifies the symptoms of the disease. In thirty-six children, from one to fifteen months old, who died with tubercles, in three cases only did I observe a commencement of excavation, which formed little holes rather than caverns. None exceeded in capacity the size of a cherry kernel.

Around these tubercles, as around the fibro-plastic granulations, the lung presents numerous alterations, very varied according to the subjects, and very variable in effect according to the intensity of the inflammatory action which surrounds each foreign body. The lung presents nuclei of lobular pneumonia, more or less numerous, or on the other hand a pseudo-lobar induration of chronic pneumonia, changes which have been previously described, and to which it is unnecessary to revert.

All the bronchial glands are hypertrophied, and for the most part converted into tubercle. This product may, moreover, be observed in various parts of the economy upon all the tissues, in all the viscera, not even excepting the brain. We can thus well observe that tuberculization is the result of a decided internal diathesis, and it is only amongst children that we can verify the truth of this great pathological law.

[The anatomical character of tubercle in the lung of children present some peculiarities. Grey granulations and crude miliary tubercles frequently exist in the lungs independently of each other and of any other form of tubercular deposit. In the adult, Louis discovered miliary tubercles unassociated with grey granulations only in two out of one hundred and twenty-three cases, or in 1.6 per cent., and grey granulations with miliary tubercles in five out of one hundred and twenty-three, or in four per cent. In the child, MM. Rilliet and Barthez found tubercle without grey granulations in one hundred and seventy-one out of two hundred and sixty-five instances, or in sixty-four per cent., and granulations alone

in thirty-six, or in thirteen per cent.; and the observations of West, which are based on fifty-four cases wherein tubercle was present in the thoracic viscera, lead to very nearly the same result. Another anatomical peculiarity of the disease and further illustrative of the acute course of tuberculization of the lungs in children, is the great frequency with which yellow infiltration of tubercle is observed in early life; MM. Rilliet and Barthez having met with it in eighty-eight out of two hundred and sixty-five children, or in thirty-three per cent., and West in sixteen out of fifty-five, or in just the same proportion. In the phthisis of children, moreover, cavities in the lungs are rarely observed. Out of two hundred and sixty-five cases that came under the notice of MM. Rilliet and Barthez, only seventy-six, or 28.6, presented cavities in the lungs, and they existed in only thirty per cent. of the cases which came under the observation of West. Lastly, in the phthisis of children abundant deposit of tubercle is observed in the bronchial glands, constituting an important form of the disease.—P.H.B.]

The phthisis of young children presents itself under two distinct forms; it is *acute* or *chronic*.

In many patients the symptoms are very difficult to distinguish, especially in acute phthisis, which may be confounded with pneumonia, of which it is, in truth, only a variety known under the name of *granular* and *tubercular pneumonia*. In fact, there may be established between the acute phthisis of infants and pneumonia, the same relation which already exists between granular meningitis and simple meningitis. This view, actual clinical observation enforces on the judgment.

Acute phthisis, whether granular or tubercular, is very frequent amongst young children, especially at a hospital. It is much less prevalent in the upper classes of the city. It is everywhere mistaken and passes for lobular pneumonia. In fact, the symptoms of these two diseases are very nearly the same, and if the children die quickly, it is at the autopsy alone that the presence of fibro-plastic granulations and tubercles in the lung is recognized. Therefore we may refer to the chapter on the varieties of lobular pneumonia, to the article on granular pneumonia, for what relates to the symptoms of acute granular and tubercular phthisis.

Chronic phthisis is more rare, so rare indeed that it has been said that pulmonary phthisis in the true acceptation of the term does not exist amongst children. If, in fact, by pulmonary phthisis we would really understand the consumption which results from pulmonary excavation by tubercles, as we say when speaking of it in man, then there is no such thing as phthisis in the infant. But if phthisis, in the modern acceptation of this word, represents the acute or chronic evolution of symptoms due to the presence of pulmonary tubercles, then, on the contrary, phthisis is very frequent amongst young children.

Chronic phthisis succeeds acute phthisis and lobular pneumonia. After the usual train of inflammatory phenomena which accompany pulmonary catarrh and inflammation of the lungs, the child appears

to recover his strength and to progress towards recovery. But the convalescence is not realized, the child languishes and daily loses flesh; the skin becomes thin, wrinkled, and cadaverous; the face contracts, and assumes an appearance of premature senility. The fever wears the child away in a slow, but continuous manner. There is cough, no expectoration, neither mucus, nor pus, and still less blood.

The shrunken chest permits all the parts being seen. It resounds less than natural, and dulness sometimes exists on the summit of the apex of the lung, or when the granulations and true tubercles are surrounded by chronic pneumonia. Sibilant, mucous, and subcrepitant râles, may be heard on both sides of the chest, sometimes on one side, sometimes on the other, or on both sides at once. Sometimes a souffle exists behind at the apex of the bronchi, and it might give rise to the inquiry whether it is a cavernous souffle, or a bronchial souffle. But as we are aware that in young children, cavities do not exist of a sufficient size to produce this phenomena, it must be referred to bronchial respiration, in consequence of chronic pneumonia, or to a considerable dilatation of the bronchi.

The cry resounds more or less according to the degree of induration of the lungs, and it is never more decided than when a well-characterized souffle exists.

Notwithstanding all these phenomena which indicate an extensive material affection of the pulmonary parenchyma, the children eat willingly—it is even difficult to restrain them in this respect. They digest well; sometimes diarrhœa supervenes and still more exhausts them, but their appetite is not on that account less manifested, and it is necessary to give them food in order to avoid scenes of temper which the parents cannot endure. The abdomen swells, and contrasts by its size with the thinness of the fleshless and withered limbs; the prostration still daily increases; the wants of the children are infinite; they must be carried in the arms; it is necessary to walk about with them day and night, and all this lasts for weeks, months, and even more than a year.

However, one day or other, without cause or reason, the diarrhœa establishes itself, never to cease; the mouth becomes deprived of its epithelium, thrush supervenes, the powers are still more exhausted, and the child, like a lamp ready to become extinguished, raises itself, sinks, oscillates, and at last dies in the extreme state of weakness, languor, and marasmus, or in the midst of unexpected convulsions, which soon put an end to existence.

[According to West, the general characteristics of the phthisis of childhood are—

1st. The frequent latency of the thoracic symptoms during its early stages.

2nd. The almost invariable absence of hæmoptysis at the commencement of the disease, and its comparatively rare occurrence during its subsequent progress.

3rd. The partial or complete absence of expectoration.

4th. The rarity of profuse general sweats, and the ill-marked character of the hectic symptoms.

5th. The frequency with which death takes place from intercurrent bronchitis or pneumonia.

Bronchial phthisis is characterized by—

1st. The frequent development of its symptoms out of one or more attacks of bronchitis.

2nd. The peculiar paroxysmal cough which attends it, resembling that of incipient pertussis.

3rd. The great and frequent fluctuations in the patient's condition, and the occasional, apparently causeless, aggravation, both of the cough and dyspnœa.

In very early infancy phthisis is remarkable for the very frequent latency of the chest symptoms, which, through its entire course, are often entirely merged in the signs of impaired nutrition.

The most important peculiarities in the auscultatory phenomena of consumption in the child are—

1st. The smaller value of coarse respiration, prolonged expiration, and interrupted breathing, owing to their general diffusion over the chest, and to their occasional existence independent of phthisis.

2nd. The apparent, and to some extent the real, exaggeration of the signs both of early and of far advanced diseases of the lungs in some cases of bronchial phthisis.

3rd. The loss of that information which the phenomena of the voice furnish in the case of the adult.

4th. The small value of inequality of breathing in the two lungs.

5th. The difficulty of detecting minute variations in the sonoriety of the chest; and,

6th. The existence of dulness in the interscapular region, together with moderate resonance of the upper parts of the chest and tolerably good respiration there, which are characteristic of the presence of enlarged bronchial glands.

It would appear from the returns of the Registrar General, that in London in 1849, of 3,318 males and 3,009 females who died from phthisis, 228 males and 236 females were under five years of age.—P.H.B.]

Acute phthisis should be treated, like acute lobular pneumonia, by antiphlogistics, one or two leeches, several times repeated according to the vital energy of the children, by cutaneous revulsives to the chest, and by emetics several times repeated.

Chronic phthisis does not, in any way, require the employment of abstraction of blood. Flying blisters on the chest, frictions with tartar emetic ointment, frictions with croton oil, are infinitely more useful. The employment of these means may be left off and resumed several times during the duration of the disease.

Internally, pectoral drinks, emollients, draughts of mucilage, juleps, combined with narcotics or opiates, should be given to young children, provided that the distaste for these medicines is not decided.

Cod's liver oil, in the dose of ʒ v a day; the iodide of potassium in a julep, three and a half to seven grains; tartar emetic, in the dose of .15 grain; oxysulphuret of antimony, three to three and a

half grains in the twenty-four hours, have been administered, and may be so with advantage.

The complications of the disease by thrush, diarrhœa, and convulsions, should be treated by means of the medicines which have been indicated in each of these diseases.

CHAPTER V.

ON HOOPING COUGH.

Hooping cough is a contagious, and at times an epidemic, disease, characterized by a convulsive cough, returning in frequent, and more or less prolonged paroxysms. These paroxysms possess a particular character. The expirations, of which the fits of coughing are composed, succeed each other with great rapidity, and are followed by a long, distressing, and sonorous inspiration, which is called the *hoop*.

History. The term hooping cough (coqueluche) has not always possessed the signification which physicians now apply to it. In the fifteenth century, this name was applied to a species of epidemic catarrh, which Mézeray, De Thou, and Pasquier (Etienne), mention in their works. One of these epidemics, described by Valleriola, does not present any resemblance with the disease, as it is observed at the present age, but was more allied to *influenza*. Without dwelling any longer on this historical question, which I cannot decide in this work, I shall confine myself to the statement that the Greek and Arabian physicians make no mention of hooping cough. Those authors, then, are quite in the wrong who have pretended to recognize this disease in a passage *in the Epidemics* of Hippocrates, in which it is simply a question of an epidemic disease of the throat, which was often complicated by inflammation of the larynx.

According to M. Blache, Willis is perhaps the first who, under the denomination of *tussis puerorum convulsiva*, *suffocativa*, really appears to have indicated the disease we are about to study.

In the eighteenth century only, has hooping cough been described as a distinct disease, and it has been termed *pertussis* (Sydenham); *tussis clangosa* (Basseville); *bex convulsiva* (Good); *bronchitis convulsion* (Bourdet); affection *pneumo-gastro-pituiteuse* (Tourtelle); *broncho-céphalite* (Desruelles); *catarrh-convulsif* (Laennec); *tussis spasmodica*, *strangulans*, *orthopnœa*, &c. (different authors.)

The etymology of the word *coqueluche*, generally adopted in France, is rather uncertain; some derive it from coquelhuchon, a cowl, a sort of hood with which people covered themselves in the epidemics of 1414, 1510, 1557, &c.; others would originate it in the extensive

use that was made of the corn-poppy flower (coquelicot) in the treatment of this disease. According to some authors, the term is due to the fact that during the fits, the sonorous respiration resembles the crowing of a cock (coq). Lastly, according to Cabanis, the name is derived because that in the epidemic disease of 1414, 1519, 1557, &c., in connection with rheumatism, it attacked the muscles of the neck, the back, and the shoulders like a cowl (coquelhucon).

Causes.

Age. Hooping cough is met with nearly exclusively in children, from the period of birth to that of second dentition; sometimes youths, adults, and even old men, are attacked by it, but much more rarely. We, who have had the opportunity of especially observing children at the breast, and at the period of early childhood, can testify that the earliest period of infancy is liable to hooping cough.

In fact, in thirty-three children attacked by this disease, six were less than two months old and three were only one month.

Sex. Girls appear more disposed to contract hooping cough than boys. In the thirty-three cases to which we have alluded, twenty-one were amongst girls and twelve amongst boys. This result agrees with that pointed out by all writers.

Constitution and mode of living. Lymphatic and nervous subjects are especially exposed to contract this disease, which equally prevails in all classes of society. It develops itself, in preference, amongst children who live in unfavourable hygienic conditions, in dull, damp, unwholesome situations, and especially amongst those who are poor, and are not properly clothed, nor sufficiently protected against the rigours of temperature.

Season and climate. This disease appears almost indifferently in all seasons of the year and in the most extreme climates. Watt, however, affirms that it is more frequent and more severe in northern regions; Pénada, on the contrary, states that in the meridianal districts of France and Italy its returns are more frequent and its consequences more to be dreaded. At Paris it is observed at all seasons, but perhaps a little more frequently in spring and in autumn.

We may here remark that, according to Ozanam, hooping cough is never observed between the tropics, and that it does not appear to be dependent on atmospheric changes.

Epidemics. All authors agree in regarding hooping cough as an epidemic disease. It is observed to invade a hamlet, a town, an entire district, and to attack all the inhabitants indiscriminately, and especially the children. It is impossible to appreciate the causes either of its appearance or of its disappearance. The return of these epidemics is not at all regular, their duration is very variable, and sometimes

the nature and intensity of the symptoms are formidable; sometimes, on the contrary, the disease is very benign. Moreover, in the present age, the epidemics of hooping cough appear to have lost much of their intensity. I here especially refer to those which originate in the hospitals for children, where the disastrous results which are observed are more due to the unfavourable hygienic conditions, and to the diseases with which hooping cough is complicated, than to hooping cough itself.

Contagion. Stoll, Laennec, Ozanam, Billard, have very incorrectly denied the contagious nature of hooping cough; this disease is transmitted with a great facility from one child to another. How the operation of contagion takes place is more than we can say. If explanations fail there are always the facts, and it is impossible to deny them. Hooping cough is transmitted in the same way as a great number of nervous affections, in the same manner as hiccough, vomiting, hysterical attacks, &c. This is a well demonstrated fact, and one which I would reiterate, as this question is of much importance in respect to the prophylaxis. M. Rostan* relates the case of a child who, while in the country, contracted hooping cough by playing with the children of the gardener, who were themselves labouring under this disease. This child successively transmitted hooping cough to his brother and sister. The mother, who often played with the last mentioned one, was also attacked; lastly, the father and all the servants who were brought into contact with these children were seized with the disease. In the house, and around the house, the children and the individuals who did not directly communicate with the patients were exempt from the disease.

"I have observed," says A. Duges,† "a little girl attacked with hooping cough communicate it to a young cousin to whose house she was occasionly brought; yet they lived in two very distant quarters, and the hooping cough was not at all prevalent in that which the latter had not quitted."

Other examples, cited by M. Blache, M. Guersant,‡ and various authors leave not a doubt of contagion. I have met with a very curious and a very interesting example of it. A woman who was confined at her own home early in August, 1843, was visited by one of her parents, who lived in quite an opposite quarter of Paris. One of her nephews, who had been labouring under hooping cough for a month, came to see her. This child remained the whole day near the newly-delivered patient, and two days after this visit, that is to say, on the fourth day from birth, the infant commenced coughing; eight days after it had hooping cough.

* *Cours de médecine clinique.* † *Dictionn. de méd. et de chirurg. pratiques;* t. v, p. 487.
‡ *Dictionn. de médecine.*

The mother and child were admitted into the Necker Hospital, where we were able to verify the existence of this disease. The child had as many as twenty attacks of cough in the twenty-four hours. Particular inquiries were made of the mother, to discover if there were other children labouring under hooping cough in the house in which she lived, but there were none. In this case, then, contagion was decidedly the cause of the hooping cough.

What is the nature of the contagious principle? Hœnssler thinks that it holds a middle place between the fixed and volatile contagious principles. According to him the principle only appears to exhale itself and communicate itself only in the third period of the disease. M. Guersant states, that in order for the contagious transmission to take place, it is necessary that the children should be sufficiently near each other to receive the emanations of their breath. Certain examples cited by authors, and that which we have above reported, would seem to prove that this circumstance is not indispensable. If we are to believe Rosen on this point, the contagion may be transmitted by the clothes of a person in going from one house to another. He relates an instance which tends to prove that he had himself transported the contagious principle. This is at least doubtful. Usually five or six days after exposure to the infection the cough begins to manifest itself; in the case we have related the cough appeared the third day after infection. The case cited by M. Blache,* which happened to one of the children of Dr. Tavernier, also proves that hooping cough does not require five or six days incubation to develop itself.

Pathological Anatomy.

As hooping cough never causes death, but rather the accompanying complications produce it, it is somewhat difficult, in *post mortem* examinations, to isolate the lesions belonging to hooping cough from those which result from the complications of the disease. We shall endeavour, however, to establish this distinction clearly.

State of the respiratory tube and of the lungs. The inferior extremity of the trachea and the bronchi is, generally, red and partially inflamed in their whole extent. This lesion is not always constant, and it would be incorrect to imagine that there exists between this inflammation and hooping cough the relation of cause and effect. The bronchi are very often filled with a transparent viscous substance; but sometimes a mucous and aërated fluid is there met with.

The inflammation of the pulmonary tissue is observed as frequently as the alteration of the bronchi above pointed out, and this will be understood on reflecting how frequently pneumonia is a complication of hooping cough. Sometimes these two changes coexist. The bronchial

* *Dictionn. de médecine;* t. ix, p. 24.

glands are then observed swollen, reddened, and even softened. It is not uncommon to meet with tubercles in these organs and in the lungs.

Dilatation of the bronchi. When death takes place at an advanced stage of the disease, dilatation of the bronchi is frequently observed; and, as M. Blache observes, it may be looked upon as a physical effect of the violent efforts which the patient puts in force during the prolonged fits of coughing. M. Guersant is of opinion that this alteration is due to a primary organization. This opinion does not appear to me very probable, especially when it is considered that not only may the dilatation of the bronchi be observed, but even the fissures in the respiratory tubes, and, at the same time, also pulmonary emphysema. This lesion should, then, be regarded as especially belonging to hooping cough.

State of the nerves. The redness of the pneumogastric nerves has not been observed sufficiently often that we can look upon this pathological condition as the result of hooping cough; besides, the subjects who presented this lesion were lymphatic and scrofulous, and if M. Breschet has observed the inflammation of the pneumogastric nerves twice, it may be looked upon merely as a coincidence.

State of the organs. In some children who die of hooping cough, a more or less strongly marked injection of the vessels of the meninges and of the brain, and sometimes an inflammation of these organs, is observed.

The lesions of the stomach and intestines are only observed exceptionally, thus to speak, and are always due to complications either purely accidental or dependent, which is most uncommon, on the hooping cough. We may, in fact, understand that the number and the intensity of the attacks may sometimes disarrange digestion, and consecutively lead to a disease of the organs of nutrition.

Complications and accidents of hooping cough. Bronchitis and pneumonia are undoubtedly the most frequent complications, and which appear to be intimately allied to hooping cough. Lobular pneumonia, so common amongst children at the breast, may justly be regarded as the cause of the fatal issue of hooping cough in most of the cases of death. In the hospitals devoted to children, tubercular pneumonia, pulmonary tubercles, are often met with as complications of this disease, sometimes inflammation of the meninges and of the intestines, very seldom affections of the stomach. Pulmonary emphysema has also been often met with. Some children fall into a very decided cachectic condition, with œdema of the legs; in others, but this is only fortuitously, hæmorrhages come on sufficiently serious to cause death. I have only once observed croup as a complication of hooping cough.

[When hooping cough is associated with the symptoms of bronchitis and pneu-

monia it becomes serious, and especially so when the symptoms come on after the cough has assumed the characters of hooping cough. Death takes place very speedily in capillary bronchitis; West has seen a child die on the sixth day from the first appearance of any indication that the disease was other than a very mild attack of hooping cough. In the complication of hooping cough with serious disorder of the nervous system the danger may assume the form of simple congestion of the brain, drowsiness being followed by convulsions, and these succeeded by fatal coma; in other instances the spinal system of nerves becomes disturbed, carpo-pedal contractions and attacks of spasm of the glottis becoming superadded to frequently recurring general convulsions; and in other cases the long continuance of hooping cough gives rise to the development of acute hydrocephalus.—P.H.B.]

Symptoms.

Hooping cough presents three distinct stages, which are observed in most patients. They are distinguished by the terms of catarrhal stage, convulsive stage, and the stage of decline.

1*st Stage* (catarrhal, bronchial, or inflammatory stage). Hooping cough is seldom a primary disease; it sometimes appears during the course or during the convalescence of diseases peculiar to infancy, such as measles, scarlet fever, smallpox, and chicken pox; it must be remembered, however, that hooping cough usually commences under the appearance of a slight cold. The child presents the alternations of heat and cold; it is sad, depressed, and drowsy, the eyes are red and weeping, the face is swollen, there are frequent sneezings—in fact, all the symptoms of coryza; the cough is dry, more or less frequent, and freely returns by fits, but without the *hoop;* the voice is slightly hoarse, the fever is not well marked, and only shows itself in the evening; or it is rather strong, and sometimes appears under a tertian or quotidian type; the sleep is disturbed and the appetite nearly or quite lost. We may understand that all these symptoms may present more or less intensity.

We may even at this stage suspect the invasion of measles, or of other eruptive fever, and the error may be easily committed during the first two or three days of the disease; but this period is prolonged from seven to ten or fifteen days, and the diagnosis of the hooping cough is soon formed. There is nothing in the initiatory catarrh to distinguish it from other catarrhs.

2*nd Stage* (convulsive, spasmodic, nervous stage of authors). The cough at first catarrhal becomes convulsive, and gradually assumes the special character of which we have spoken. It is at first dry, noisy, very different from the cough of catarrh and of hooping cough; it is so frequent that the children have hardly time to suck. It lasts for some days, and then the fits of hooping cough make their appearance. In certain cases, however, the convulsive stage comes on suddenly, and without precursory phenomena.

In this stage, the attacks last longer, and have less interval than in the catarrhal stage, and are a little more frequent during the night than during the day. It is characterized by numerous efforts of cough, followed by a sonorous inspiration called the hoop, after which other efforts take place, and a fresh blowing inspiration, which may be repeated until the patients faint. They are greatly depressed, *sometimes vomit*, and remain for some instants unconscious.

When the hooping cough is well established, the little children seem to have a presentiment of the coming seizure of convulsive cough, and they show it by visibly accelerated, irregular, and incomplete movements of inspiration and expiration; they appear as if seized with fright, and sometimes begin to cry. Directly the attack comes on, they catch hold of the persons and bodies which surround them as if to avoid a danger; but soon the attacks of cough immediately succeed each other, nearly without an interval, so that respiration is impossible, and suffocation appears imminent. The face is swollen, red, and even bluish; the eyes full of tears and projecting from the orbits. The superficial arteries are observed to pulsate violently; the veins of the neck are distended, and all the capillaries injected. It is not uncommon during the attack to observe blood flowing from the nose, mouth, or ears; it is sometimes effused into the conjunctiva and into the cellular tissues of the eyelids. I have even observed one case in which the child shed *bloody tears*, and many students following the practice of M. Trosseau can verify this fact. These hæmorrhages are sometimes very dangerous, and may, by reason of their extent, compromise the life of the child.

Some physicians pretend that they have observed hæmatemesis in hooping cough, but they are in error; the vomited matters and the saliva tinged with blood that are met with owe their colour simply to the blood which has descended into the throat during the epistaxis so frequent in this disease.

During the attacks, the little patient has its limbs contracted; its body, and especially the neck, shoulders, head, and face, are covered with a clammy and abundant sweat; vomitings take place, and sometimes the urine and fæcal matters escape involuntarily. Prolapsus of the rectum has been observed, rarely it is true, and the formation or the reappearance of herniæ; the pulse is small, weak, and even hardly perceptible; and the convulsive state which appears confined to the organs of respiration may become generalized and give place to true convulsions.

The attacks of cough are, as we have remarked, followed by a long sonorous and characteristic inspiration, which may be compared to the crowing of a cock, and which has received the name of *hoop*. After this inspiration, fresh attacks of cough succeed, accompanied by the

same phenomena. Thus two, three, four, or five *hoops* may be observed, and the fit of coughing terminates by the expectoration of a glairy, tenacious, colourless liquid, sometimes mixed with mucous and alimentary matters contained in the stomach, which have been ejected by vomiting.

The attack may simply consist of a single attack of cough and a single hoop, and then it lasts but a minute at most; usually its duration is from one to five minutes, and it is sometimes prolonged to a quarter of an hour. The attacks follow each other about every six or ten minutes; more frequently they are only observed to be repeated every two hours, or even much less frequently. The return of the attacks may be either regular or irregular, and may depend on an apparent or hidden cause; the impression of cold, the cries, weeping, pain, temper, the distention of the stomach, the accumulation of mucus in the bronchi, the inspiration of too dry an atmosphere, or one charged with powdery matter, bring on the attacks of cough. The fits, notwithstanding that Laennec states to the contrary, are more frequent in the night than in the day, and in the morning and evening than in the middle of the day, a circumstance which brings hooping cough into a closer relation with the nervous affections.

M. Blache and other authors have remarked, that when several children attacked with hooping cough were assembled in one place, if one commenced coughing, the others also soon coughed. Several times, in fact, it has been impossible for me to remain in the ward of these little children, so distressing to the ear was the noise which accompanied their efforts of coughing.

After the attack, the face and neck remain swollen, the eyes injected, the respiration and the pulse are accelerated, and the limbs are sometimes agitated by a sort of convulsive trembling. I have observed many children, immediately after the attack has terminated, commence crying. However, these phenomena are of short duration, and if the fits of coughing are slight, the children are soon observed to recover their spirits, return to the breast of the nurse, or quickly fall asleep.

In the interval of the fits of coughing there is little or no fever, and the child preserves its appetite, spirits, and strength, even when the attacks are frequent; however, if the fits of coughing very quickly follow each other, the child appears pallid, weakened, and remarkably depressed.

During the fit of coughing, auscultation permits the recognition of the concussion given to the trunk, and in the short intermissions existing between the expulsive shocks of the cough, a little rhonchus or the respiratory sound may be heard. The long-drawn noisy inspiration, which is pathognomonic of the fit, appears to take place in the larynx, and may be due, as it has been remarked, to the spasmodic contraction

of the glottis. The air at length enters the lungs and the respiration becomes puerile in the children. Laennec was the first who proved these facts, and they have since been fully confirmed.

This second stage has no fixed duration, it may be prolonged for several months; it generally terminates after fifteen or twenty days.

3rd Stage (stage of decline). The fits of coughing successively diminish in frequency and intensity, and the shocks of cough become less violent. The inspirations are more easy, and the noise which accompanies them becomes gradually weaker previously to entirely disappearing. The vomitings cease; after the fit of coughing, then, an expectoration of opaque, yellow, or greenish mucosities is only observed, analogous to that which characterizes the period of coction in bronchitis.

Hooping cough appears to assume on its decline the symptoms of the second stage of bronchitis. However, a less active cause such as fright, severe pain, anger, &c., may bring back a convulsive attack precisely resembling that of the second stage, although the child may have appeared quite free from any fit of cough for fifteen days or a month. The third stage does not appear to last less than eight or ten days, nor to prolong itself beyond several months.

Progress—Duration—Terminations.

The progress of hooping cough is not always simple and regular. This disease presents numerous varieties, either in its intensity, or in the return of the attacks, which in certain cases become regular and assume an intermittent type. The fits of coughing are sometimes so long and so violent, that amongst very young children they may occasionally bring on fatal convulsions.

Age modifies in a still greater degree the progress of hooping cough, and in children at the breast this disease is more frequently complicated with inflammation of the lungs than at every other period of childhood; this remark is especially applicable to those cases of sporadic hooping cough which have presented themselves to our observation.

During epidemics, this disease often presents peculiar forms. Sometimes the first stage, called the *catarrhal stage*, is entirely wanting; sometimes on the contrary, it is the stage of decline which is not observed; occasionally no convulsive stage exists, and children are observed who, in these epidemical circumstances, have a violent catarrh with rather violent fits of cough, but without hoop; they have the catarrh of hooping cough without having its convulsive attacks. I shall return to this subject when speaking of the treatment of this disease.

It is difficult to define the duration of hooping cough; it varies from a few days to several months; it is sometimes prolonged for five or six months; and has been observed to last for two years.

Return to health is the most frequent termination of hooping cough; it is not very rare, when the disease lasts a long time, to observe the children become emaciated, fall into a state of great weakness and marasmus, which is nearly always fatal. This termination should be considered as due either to the frequency of the vomitings, to a catarrh or to a chronic pneumonia, or lastly, to pulmonary tubercles. Hæmorrhages, cerebral congestion, apoplexy, the formation of inguinal and umbilical hernia, &c., have been observed, in consequence of the violent efforts to which the child is a victim during the fits of coughing.

In speaking of the pathological anatomy we have likewise pointed out the dilatation of the bronchi as a consequence of the convulsive cough. But all these accidents are only exceptional, and death, when it does take place, is the result of an intercurrent disease, unless it has been produced by suffocation, which has been but very seldom observed.

Those authors who have pretended that hooping cough may be terminated by a crisis, have not reported any well authenticated observations in support of it; we do not attach the slightest importance to it, and we still remain in doubt on this point.

Recurrence.

The question of the recurrence of hooping cough is not yet decided. Thus, M. Trousseau* mentions the case of three children who experienced a return of the convulsive cough, either after two months or after three months of complete cure; but he asks whether these are true recurrences or simply instances of relapse. This professor, not daring to solve the difficulty, remains in doubt, and does not determine at what epoch hooping cough may be considered as definitely cured, nor after what lapse of time we can state that the disease we observe is a second attack.

Most authors only make mention of recurrences of hooping cough to deny them. Some, however, admit them; for authenticated facts, although in small number, prove that this disease may declare itself twice in the same individual (Blache). However, it must be admitted that after the cure of hooping cough, the children may still, for some time, have the fits of cough characteristic of this disease, under the influence of a moral impression, of anger, and of any strong nervous excitement. In some children, hooping cough is observed to cease suddenly, and to reappear at the end of fifteen or twenty days. I have observed a case of this kind.

Diagnosis.

It is easy to establish the diagnosis of hooping cough from the special

* *Memoirs sur la coqueluche. Journal de médicine;* Janvier, 1843.

characters which the cough of the convulsive stage presents. The hoop between the efforts of coughing, that is between the rapid expiratory motions, only appertains to hooping cough, and we doubt whether there can be hooping cough without the characteristic hoop. The examples of this disease, with fits of coughing without the hoop, belong to bronchitis; and to say that there are hooping coughs without the hoop, as there are scarlatinas without eruption, is indeed attempting to force an analogy.

This form of hooping cough, admitted by some authors, is only observed in the midst of epidemic circumstances.

Hooping cough might perhaps be confounded with a variety of bronchitis in which the cough also comes on in distressing fits, with more or less interval. But in this variety of bronchitis the cough differs from that of hooping cough, and has not the *noisy sonorous hoop* in the inspiration; the febrile state is well characterized, which is only very seldom observed in hooping cough; there are no *vomitings* at the termination of the fit of coughing, and there is scarcely any expectoration.

This absence of the expectoration in the catarrh of young children is, moreover, a very curious fact, and Constant* properly insists on this symptom, which should be of assistance in the diagnosis of the hooping cough of children at the breast. In fact, this disease of early childhood is nearly the *only one* in which an abundant expectoration is observed.

In hooping cough the three varieties which nosologists have admitted may be distinguished:

1st. Inflammatory or sthenic hooping cough. It is recognized by the intense fever, the colour of the face, the heat of the skin, and the excessive thirst; hæmorrhages are frequent, and the disease makes a rather rapid progress.

2nd. Mucous or catarrhal hooping cough, which presents a very slightly developed febrile state; there are symptoms of gastric and intestinal derangement; anorexia, yellowish tongue; frequent and abundant vomitings of mucous or biliary matters.

3rd. Lastly, nervous or spasmodic hooping cough, in which the phenomena of the convulsive stage are developed in the highest degree.

[The only disease with which hooping cough can be confounded are—

(1) Bronchitis and bronchial catarrh when accompanied by spasmodic cough; and (2) tuberculosis of the lungs, and especially of the bronchial glands, particularly when accompanied by a spasmodic cough, strongly resembling that of pertussis, and when the physical signs do not clearly indicate the presence of tubercles.

The following tables are extracted from Valleix (*Guide du Médecin Practicien*):

I. Distinctive signs between pertussis and acute bronchitis with spasmodic cough.

* *Gazette médicale de Paris.* 1836; p. 531.

Pertussis.	Acute Bronchitis with Spasmodic Cough.
Commences with catarrh.	Often commences suddenly with cough.
Fits of coughing terminate with whistling inspiration, tenacious expectoration, and vomiting.	Fits of coughing less severe; no whistling inspiration, tenacious expectoration, or vomiting.
No fever in uncomplicated cases.	Much fever at the commencement.
Respiration natural; the normal respiratory murmur being heard in the intervals between the fits of coughing.	Different *râles* in the chest.
Only occurs once in the same subject.	May attack persons frequently.
Symptoms intermittent.	Symptoms continuous.

II. Distinctive signs between pertussis and tuberculosis of the bronchial glands.

Pertussis.	Tuberculosis of the Bronchial Glands.
A contagious and often an epidemic disease.	Neither contagious nor epidemic.
The fits of coughing prolonged, terminating with a whistling inspiration, tenacious expectoration, and vomiting.	The fits of coughing very short, and not terminating with whistling inspiration. tenacious expectoration, or vomiting.
No general symptoms in uncomplicated cases.	Symptoms of hectic fever.
Voice natural.	Voice often altered.

Nature of Hooping Cough.

The synonomy of hooping cough sufficiently betrays the numerous hypotheses which have been enunciated on the nature of this disease. We shall merely enumerate them, without troubling ourselves to discuss them here, or to enter into the details of a complete examination. M. Desruelles* considers hooping cough as a bronchitis complicated with encephalic irritation. Some physicians look upon bronchitis and hooping cough as two identical diseases; others admit that hooping cough is only a variety of catarrh, while M. Guersant believes that it is a specific inflammation of the bronchi, attended with lesion of the nervous power of the pulmonary apparatus. M. Blache* and many others are of opinion that hooping cough is a nervous disease, the seat of which is sometimes in the mucous membrane of the bronchi and in the vagus nerve; a nervous disease very often complicated with bronchitis and pneumonia, but which may exist without these complications; and that, like all nervous diseases, hooping cough possesses no appreciable anatomical character.

Dr. Todd (*Med. Times and Gazette;* p. 205, 1854), after deciding against the lungs, the glottis, and the bronchial glands as the seat of the disease, thus remarks: "Having, then, set aside all these so called causes of hooping cough, the only supposition now left us, as to the true cause of the disease, is, that it depends upon some peculiar irritation of the vagus itself. In fact, hooping cough is a special disease of this nerve, the irritation being quite as complete as when the exposed

* *Traite de la coqueluche.* Paris, 1827. † *Dictionnaire de médecine;* t. ix, p. 46.

nerve is mechanically stimulated. But the cough differs from that which is produced by mechanical irritation of the nerve, in its coming on in paroxysms at longer or shorter intervals from each other, the patients health, during the intervals, being very good. This paroxysmal character of the disease, with the complete state of health in the intervals, except when the constitution or the lungs have become damaged by the effects of the cough, associates hooping cough with other diseases, the peculiar phenomena of which depend upon some poison in the blood, manifesting its presence by the specific action which it exercises on some particular tissue, and by the interference which it seems to offer to the due performance of healthy function. For certain poisons undoubtedly appear to have a peculiar affinity for certain tissues; thus, the poison of measles appears to have a special affinity for the mucous membrane of the bronchial tubes and bowels, that of scarlatina for the throat, and so on of the other acute specific diseases. In like manner the poison, which gives rise to the phenomena of hooping cough, seems to have a peculiar affinity for the vagus nerve; but whether throughout the whole course of that nerve, at its centre or its periphery, it is impossible, in the present state of our knowledge, to affirm with any degree of accuracy. It is no valid objection to this view of the nature of the disease to say, that after death no structural alteration of the vagus can be distinguished, although Autenrieth and others state, that in cases of hooping cough, examined after death, they have found the vagus in a congested condition. But congestion is much more frequently the effect than the cause of a disease; and it may be especially so in this case. In many nervous affections, as for instance in those distressing cases of neuralgia in which the most intense pain has existed during life, no appreciable morbid condition of the nerves, supposed to be the seat of the pain, can be detected on the most careful examination after death. The poison in hooping cough, whatever it be, produces no structural lesion in the nerves, and leaves nothing behind it of which our senses can take cognizance.

Hooping cough, then, as far as present knowledge enables us to speak, is a disease which runs a certain course, can be communicated from one person to another, and is probably due to the influence of a poison which gets into the system, and produces its local manifestations on the vagus nerve. It is not an inflammatory affection of any part, being simply dependent on a morbid state of the blood, caused by the introduction into it of some poison from without; and whatever inflammations may occur in the course of it must be regarded in the light of complications of the disease."—P.H.B.]

Intercurrent Diseases.

It has been for a long time remarked that the initiatory fever of smallpox causes hooping cough to cease; but authors have not expressed, in a sufficiently explicit manner, the influence which an intercurrent febrile state possesses in nearly always slightly diminishing, and, sometimes, even curing hooping cough. M. Trousseau* has drawn attention to this question, and he has clearly determined this point of pathology. I have been enabled, in his practice, to verify the truth of the results he has published, and I have observed that if hooping cough is not always cured, it is at least constantly modified by the intercurrent disease. Then the fits of cough are often less strong, less distressing, and much less frequent. As M. Trousseau observes, if

* *Mémoire sur la coqueluche.*

the intercurrent diseases cause the patients to run some risks, they may, by a fortunate compensation, lessen the symptoms of the principal disease.

The various intercurrent diseases which possess the above mentioned influence over hooping cough are—acute pulmonary catarrh, pneumonia, severe enteritis, meningitis, the fever consequent upon the eruption of a tooth, the operation for hydrocele (Trousseau, *Op. Cit.*), vaccination, and various inflammatory eruptions.

It must, however, be observed, that in some patients the intercurrent febrile state has no influence at all on the disease we are now considering. M. Blache has undoubtedly only remarked the exceptions of this nature, when he maintains that he has never observed that the diseases supervening in the course of hooping cough can shorten the duration of it.

It is difficult to account for the action of the intercurrent diseases on the progress and intensity of hooping cough. It is a fact which must be admitted without explanation, and which is perpetrated by this aphorism of Hippocrates, *febris spasmos solvit.* However, fever only possesses an influence over hooping cough similar to that which it exercises over other nervous diseases.

Prognosis.

Simple hooping cough, in a child of good constitution, is a very slight disorder; but if the child is very young, or if it is of a feeble and bad constitution, a guarded prognosis should be delivered. In winter and autumn, the hooping cough being generally more severe, the prognosis should be given with more circumspection. Emaciation or anasarca, a continual fever, violent and repeated fits of coughing, the breathing remaining oppressed and frequent during the intervals of these attacks, the sudden but decided change in the face, any one of the serious complications previously enumerated, nearly always announce an approaching death, and render the prognosis very serious.

[The following abstract, from the Report of the Registrar General, shows the total number of deaths in London from hooping cough, and the number of deaths in last quarter during the years 1845-9:

	1845.	1846.	1847.	1848.	1849.	Total of the quarters.
Quarter ending March . . .	411	767	544	374	905	3001
,, June	463	545	392	449	739	2588
,, September . .	385	355	238	340	428	1746
,, December . .	557	368	426	472	273	2096
Total of the different years .	1816	2035	1600	1635	2345	

P.H.B.]

Treatment.

However extensive may be the number of remedies eulogized by writers as specifics in hooping cough, it must really be acknowledged that this disease is one of the least amenable to all kinds of treatment;

all the resources of therapeutics have been successively exhausted against it without obtaining satisfactory results. We will nevertheless pass in review the various plans of treatment which have been applied against it, mentioning those which decidedly appear to merit the confidence of practitioners.

Hygienic and prophylactic precautions. The children should be kept from the cold and damp. When the temperature is mild and dry, it is as well that they should walk out.

The meals should rather be frequent than copious. With respect to children at the breast, the nourishment need not be very varied; the milk of the nurse is always the best food for them: if they are weaned, light soups, fresh eggs, baked fruits, &c., should constitute the regimen; towards the decline, the aliment may be a little more generous. The intensity of the hooping cough, and the complications, would naturally require modifications in the choice of food.

Flannel clothing and dry frictions are useful in young children who are weak, and especially in autumn and winter; but a change of air appears to be the most favourable condition for causing the disappearance of the cough, or at least to bring about a considerable amelioration.

The only preventive of the hooping cough is isolation. Vaccination, which has been recommended in order to prevent this disease, does not accomplish this end, it only affords some advantages in diminishing the duration of the disease, and then it only acts by occasioning an intercurrent febrile state, capable of suspending the spasmodic symptoms.

1*st Stage.* At the commencement of hooping cough, and as long as the first stage lasts, the physician should confine himself to the prescription of warm mucilaginous drinks, juleps of gum, to which may be added a small quantity of syrup of poppies; if there are symptoms of cephalalgia or of cerebral congestion, irritant pediluvia of mustard water, of soap and water, and mustard plasters applied to the extremities, may prove of service; constipation may be removed by emollient enemata; the child should be kept from the action of cold and damp, lactation should not be interrupted, and if the little patient is already weaned, light soups should be sufficient for its regimen.

Abstraction of blood, which is useless and even dangerous in ordinary cases, only presents real advantages in vigorous children, or in the course of certain epidemics. It should be made use of when at the commencement, the fever being very violent, there is redness of the face, or a tendency to cerebral, or to pulmonary congestion. The revulsives we have just mentioned, combined with slightly laxative enemata, will here be found to be of use.

It is not possible, as some authors imagine, to oppose the ulterior development of hooping cough, either by repeated bleedings, by diffusible stimulants, or by an emetic. The complications are what we must

be on the look-out for, and against which we must guard; as soon as they manifest themselves, we must not hesitate to treat them by the most energetic means.

If in this stage, want of appetite is observed, loathing the breast of the nurse, or a distate for food; and if the tongue is foul, an emetic should be given. Ipecacuanha may be administered in powder in the dose, four and a half to seven and a half grains suspended in syrup, which may be taken three or four times, every ten minutes.

2*nd Stage*. When the hooping cough is mild and moderate, it is useless making any change in the treatment above indicated. A mucilage draught, to which syrup of poppies is added, juleps, emollient or slightly laxative enemata, and one or two emetics, constitute the treatment to be put in force. The following are the precautions which should be taken during the convulsive cough, that is to say, during the fit. The child should be placed in the sitting posture or taken in the arms, and the head supported by the hand; these precautions are indispensable, for it may happen, as M. Guersant has observed it, that a young child left on his back may nearly perish of suffocation. The rejection of the viscid matters which fill the mouth of the little patient at this time may be facilitated, by drawing them out with the finger or with a piece of linen. "When we can make the patient drink in small quantities during the fit, the intensity and duration of it is sensibly diminished."—(Laennec.)

A too active congestion of blood towards the brain may be treated by mustard plasters to the feet, and compresses of cold vinegar and water applied on the forehead.

It is hardly necessary to mention that whatever may be the dominant constitution and the season, if the hooping cough is complicated with inflammation or with any other disease, it should be treated by the appropriate means.

Hooping cough, free from every complication, may, as we have observed it, obstinately persist in preserving its convulsive character. Bleeding, emetics, purgatives, sedatives, and antispasmodics have been had recourse to.

1. *Bleeding*. We have already noticed that we must look upon this means as injurious in the catarrhal and nervous forms of the disease; it may be of service in the inflammatory form. Up to the present time it has appeared that bleeding was principally useful in the winter and spring epidemics of hooping cough, whilst they are less advantageous in the hooping coughs of summer, for these emetics should in preference be administered. It is for the physician to seize on the indications in order to discover which is the plan of treatment he ought to adopt.

2. *Emetics*. Experience has for a long time sanctioned the

praises bestowed on repeated emetics. These evacuants, observes M. Guersant, keep off and diminish the intensity of the fits of coughing, especially when the secretion of mucosities is very abundant and obstructs the bronchi. Little children bear emetics very well; however, they must not be repeated every day or every two days, as Laennec recommends. We should be guided by the state of the strength of the child, and only give an emetic several times in the course of a hooping cough if the patient is vigorous, and if the disease presents the catarrhal form. A plethoric state of the subjects, and a tendency to cerebral congestion, contra-indicate the employment of this means.

If the employment of emetics is decided upon, ipecacuanha should be administered in the form above mentioned, tartar emetic in the dose of half a grain in a draught, of which the child should take a tea-spoonful every ten minutes, until several vomitings have ensued. Notwithstanding the dispraise which has been cast upon ipecacuanha, I think it right still to recommend it, for it has not appeared to me to merit the reproach of being uncertain in its effects.

3. *Purgatives.* Calomel, which is considered an evacuant and an antispasmodic, at the same time that it possesses the property of modifying the secretion of the mucous membranes and of facilitating the expectoration; manna, rhubarb, syrup of white roses, either alone or beaten up with equal parts of olive oil; syrup of chicory, and various cathartic salts: these are the purgatives employed, either under the title of revulsives or to oppose the constipation. They are far from procuring the same advantages as emetics, but, either alone or continued with these last, they are often productive of benefit.

Opium. Old physicians placed great confidence in opiates in the treatment of hooping cough; in the present day, however, the efficacy of this means is not recognized. On the contrary, it is observed that opiates favour cerebral and pulmonary congestion, throw the patients into a restless prostration, causing dryness of the throat, and diminishing the expectoration, which are very unfavourable circumstances.

However, opium given in small doses, and combined with various antispasmodics (musk, castoreum), or, better still, with belladonna, may be very useful amongst nervous subjects, and whilst the convulsive form is well characterized; but when an intense febrile reaction exists, and when the children evince that disposition to plethora of which we have spoken, it must not be administered; the syrup of poppies is the only preparation which may be then given, in the dose of ℥ ij to ℥ iij, in a gum julep.

I do not recommend the employment of morphia by the endermic method in young children. This means is only useful in a more advanced age.

Belladonna. The German writers praise belladonna beyond measure, and would almost consider it as a specific in hooping cough; they recommend it even at the commencement. But it is principally during the second stage that it is of service, it being always a condition that there is neither acute bronchitis, nor phenomena of cerebral congestion, nor any pulmonary congestion; it would be then more injurious than useful. Laennec employed belladonna in the form of extract, in the dose of .15 to .37 grain, and he admitted that it calmed the spasm of the bronchi and diminished the difficulty of breathing. MM. Guersant, Blache, and Baron also prescribed belladonna in gradually increasing doses, even until the symptoms of narcotism were produced. M. Trousseau associates opium and valerian with belladonna, and thus avoids the insomnia which this substance most frequently causes. The tincture and the syrup of belladonna are convenient preparations to give to children at the breast, and they should be preferred to the other methods of administration.

This remedy has also been employed by means of frictions on the chest, but it then appears to possess very slight efficacy.

Conium. Conium is far from deserving the repute it has acquired; like other sedatives, it possesses the inconvenience of diminishing the expectoration. Nevertheless, M. Guersant appeared to place great confidence in the following mixture:

Belladonna, conium, oxide of zinc—of each equal parts.

Commence by the .15 of a grain, repeated three times a day, and progressively increase it according to the state of the little patieut. But should the good effects which are obtained be attributed to the conium? A great portion of the success may be referred, at least so it appears to me, to the belladonna and oxide of zinc. Let us profit by this occasion to remark that the combination of various narcotics possesses a more powerful action than that of the component parts given separately.

Hyoscyamus, lactuca, cherry laurel water, repeatedly distilled and unfiltered, hydrocyanic acid, have been also recommended in the second stage of hooping cough, and have produced a more or less decided effect. Distilled cherry laurel water and hydrocyanic acid are remedies which we can scarcely make use of for little children.

If we would obtain the real effects from narcotics, their employment should be suspended for some days, and then resumed; for without this precaution, the economy soon becomes accustomed to them, and all the benefit of the medication is soon lost.

Antispasmodics. Every one of the remedies of this class has been employed against hooping cough. The only ones which are in much repute are musk, castoreum, syrup of ether, assafœtida, oxide of zinc, the subnitrate of bismuth. Musk has especially succeeded in

those subjects endowed with a nervous constitution; artificial musk (a mixture of concentrated nitric acid and oil of amber) would appear preferable to musk itself.

M. Guersant has observed the oxide of zinc succeed, especially in very young subjects, in the dose of one or two grains every two or three hours, without exceeding the extreme limit of fifteen to twenty grains a day. I have often employed it thus, in fractional doses, either alone or combined with a small quantity of powder of valerian or of belladonna, and I have always found benefit from its use.

Under the title of an antispasmodic, cochineal has been administered in all stages of the disease, and it is said, always with success. It should be be administered in the following manner:

Cochineal	15 grains.
Carbonate of potash	15 grains.
Sugar	22.5 grains.
Warm water	℥ iij.

Make a mixture, of which a teaspoonful should be given three or four times a day.

Tannin has been given in the following dose and manner:

Tannin	
Benzoic acid—of each	1½ grains.
Powdered gum arabic	60 grains.

Mix and divide into twelve doses, one of which should be taken every two hours in water.

Alum is often made use of in the hospitals for children at London, in the dose of one and a half to seven and a half grains every four or six hours to children from one to ten years of age.

The following is the formula which is generally used:

Sulphate of alumina and potash . . .	11 grains.
Extract of conium	9 grains.
Syrup of corn-poppy	℥ iij.
Fennel water	℥ iij.

Mix. A dessert spoonful every six hours.

We have seen M. Trousseau try, without much success, the subnitrate of bismuth and the syrup of strychnine in a case of hooping cough which had resisted all the means extolled against this disease.

The treatment which sometimes succeed in suffocative catarrh has also been tried; I refer to the respiration of etherized vapours. M. Bell* speaks very highly of the results obtained by sprinkling a little ether on the clothes of the patient at the onset of the paroxysm. Use has also been made of fumigations composed of a mixture of olibanum, benzoin, and styrax, of each eight ounces; of lavender and rose flowers, of each five pounds. But we should only have recourse to these remedies after all the usual resources have been exhausted.

* *Dictionnaire des études médicales;* 14e liv.: p. 226.

[The following are the results of Dr. Churchill's experience of ether and chloroform in the treatment of this disease: "Soon after the discovery of the anæsthetic effects of *sulphuric ether*, it struck me that it would be likely to modify or suspend the spasm in hooping cough; and having a case under my care, I directed that a little (I suppose about half a drachm) should be spilled upon the nurse's hand, and held before the child's nose and mouth at the commencement of a fit of coughing. I preferred this simple mode of administration, and do so still, because of the impossibility of thereby giving an overdose. The effect surpassed my expectation; most generally the paroxysm was shortened one half—often stopped immediately—and the duration of the disease unquestionably considerably diminished. Since then I have tried the ether in twelve or fourteen cases, and *chloroform* in six. In one or two cases no benefit accrued, in others great mitigation of the spasm, and in three or four almost complete relief when the ether was applied at the beginning of a fit of coughing. Decidedly also in two thirds of the cases the course of the disease was much shortened, so that I look upon this as a valuable addition to our remedies. In no instance was insensibility or the least inconvenience occasioned."—(*On Diseases of Childhood;* p. 223.)

In the cases of very young children it is difficult to cause the inhalations to be performed at the right time and in the proper manner, but in older children (twelve or fourteen) Dr. Churchill directs the inhalation to be used at the moment when tickling in the larynx is felt, the chloroform removes the spasm and the cough is for the time prevented. By persisting with the chloroform in this way the threatenings of attacks becomes less frequent and at last cease.—P.H.B.]

It may be of advantage to administer internally a few spoonfuls of a julep of ℥ iss to ℥ ij, to which four or five drops of liquor ammoniæ have been added. Although I have not employed this remedy, it may be imagined that it would possess, in hooping cough, the same result as in other nervous diseases attended with suffocation, such as hysterical spasms, the dyspnœa of pulmonary emphysema, &c.

Here would also be an opportunity of employing cauterization of the palate or of the pharynx with ammonia. This operation rapidly applied, with all the necessary precautions, by means of a brush composed of cotton or of wool slightly moistened, undoubtedly puts a stop to the nervous symptoms of hooping cough, in the same manner as it causes the disappearance of the asthma, consequent upon pulmonary emphysema. It is a means of which we cannot judge *à priori*, and is one which is well worth the trial.

Tepid baths once or twice a day, especially when the nervous symptoms predominate, have appeared to diminish the attacks, and procure sleep. To guard against determination of blood to the brain, the head and forehead should be bathed with a sponge dipped in cold water. But in the case of inflammatory complication of the thoracic organs, we should abstain from this remedy, or at least employ it with the greatest caution (Blache, Guersant).

Revulsives. No importance is to be attached to cutaneous revulsives applied to young children, they only produce very extensive irritation, cause insomnia, and sometimes bring on a more or less intense febrile

state. Thus blisters, the pomade of Autenrieth, and spirits of turpentine should, in our opinion, be proscribed in the treatment of hooping cough in children at the breast. These means are only useful in those cases in which an intense bronchial inflammation exists at the same time as the hooping cough.

Other internal revulsive means may be employed with more advantage. Thus, the daily cauterization of the pharynx and of the epiglottis with a solution of nitrate of silver, fifteen grains to one ounce of distilled water, effected the cure of a hooping cough in eight or ten days. We may even employ, as I have previously observed, slight cauterization with weak liquor ammoniæ, applied by means of a brush not too full of liquid.

[Dr. Watson (*Assoc. Med. Journ.*, August) speaks of the great utility of topical applications to the larynx in hooping cough; he uses the sponge and whalebone employed by Dr. Green, with a solution of nitrate of silver of *variable* strength from gr. xv to ℈ ij to ℥ j according to the stage of the disease; it should be applied every second day or more frequently if the hoops are violent. Watson (*Glasgow Med. Journ.*, April) combining his cases and those mentioned by Soubert (*Bulletin de Therapeutic*. Dec. 52), finds that by this means in 125 cases, 62.4 per cent. were cured within a fortnight, 31.2 per cent. within three or four weeks, and 6.4 per cent. resisted the treatment.

When the disease is complicated with convulsions, the treatment will be of no avail without the frequency and violence of the cough can be lessened. Hydrocyanic and belladonna are likely to be of service in these cases.—P.H.B.]

3*rd Stage.* When the hooping cough has arrived at the stage of decline, the fits of cough, although less frequent, still preserve their convulsive character, and sometimes the termination of the disease is delayed a long time. The emollient ptisans should be discontinued, and replaced by tonics and bitters.

Light decoctions, lichen, gentian, polygala, centaury, quinquina, infusions of wild thyme, or of hyssop, may be given; and, according to the age, sulphurous mineral waters, those of Bonnes, of Cauterets, or of Enghien, either alone or mixed with milk or corn-poppy water.

Lastly, when the disease prolongs itself, and when a chronic catarrh succeeds hooping cough, a blister may be applied over the chest, then it may be reapplied over the arm, or may be replaced by an issue.

[As the disease manifestly does not consist in an inflammatory condition of any part, the antiphlogistic plan of treatment should be avoided, as its tendency is to weaken the nutrition of the lungs and the nervous system, and to impoverish the blood; to reduce the quantity of its colouring matter, to favour the accession of convulsions, and, by the watery parts of the blood filtering through the walls of the blood vessels, to promote the tendency to hydrocephalus.

The occurrence of bronchitis and pneumonia, as complications of the disease, should be carefully guarded against, by keeping the patient in a well-ventilated apartment, of uniform temperature; at the same time the general nutrition should be attended to by a nourishing and easily digested alimentation, meat in regulated quantities, and properly masticated.

Dr. Todd speaks of sponging the chest with *cold water*, once or twice a day, as a practice which exercises a most favourable influence on the nervous system. This sponging of the back and front of the chest, night and morning, exercises a bracing and tonic influence on the nerves, and in this way often acts very beneficially in this disease. Sedative and antispasmodic remedies, in virtue of the power which they possess of allaying irritability of the nervous system generally, such as the various preparations of opium, henbane, conium, belladonna, and hydrocyanic acid, are beneficially employed; the non-nauseating expectorants, such as chloric ether, ammonia, and senega, may be used; and when the bronchial secretion is excessive, alum, sulphate of zinc, tannic and gallic acids, are often of service.—P.H.B.]

APHORISMS.

207. Hooping cough is a special and specific disease, the result of the influence of a specific, indiscernible, and incontestable agent, the effects of which, on the organism, always astonish the common herd of anatomo-pathologists.

208. Fits of coughing, the successive attacks of which are interrupted by a long, sonorous, and noisy inspiratory *hoop*, characterize hooping cough.

209. Hooping cough is evidently a contagious disease.

210. Hooping cough is often epidemic.

211. Hooping cough, originating in a place, dies and disappears a little distance off, by the sole fact of removal, and of the modifications occasioned in the hæmatosis by the change of air and of locality.

212. Hooping cough is sometimes observed in children at the breast and in adult age, but it especially attacks subjects of second childhood.

213. Hooping cough is a nervous disease grafted on a bronchitis; it commences by a catarrh, and terminates by spasms peculiar to itself.

214. Hooping cough is unfavourable at certain times, according to the epidemic constitution of the situation, or of the year.

215. It is a singular fact, that hooping cough only appears to possess importance from its indirect consequences; for instance, the vomitings which result from the fits of cough, and which bring on inanition; and also, the fibro-plastic deposits of the lungs which sooner or later engender granular pneumonia, &c.

216. Hooping cough is the only disease of early childhood in which the cough is accompanied by a real expectoration.

217. An acute disease, coming on during hooping cough, diminishes its intensity, and causes its disappearance, either for a short time, or in a definite manner (Trousseau).

CHAPTER VI.

ON THE ASPHYXIA OF INFANTS.

In medicine the term *asphyxia* is applied to the disturbances of hæmatosis, caused by the more or less complete suspension of the respiratory movements. Now this definition is more suitable than any other to the morbid condition of infants which is observed at the moment of birth, which very distinguished authors describe under the vague term of apparent death, and which other writers often designate under the name of apoplexy, or the apoplectic state of infants.

Causes.

The asphyxia of infants may result from compression of the cord against the walls of the pelvis during labour; from twisting of the cord obstructing the flow of blood in its interior; from premature separation of the placenta; from laceration of the cord or placenta, and consequent hæmorrhage; from compression of the fœtus in consequence of defect in the conformation of the pelvis; from compression of the head by the forceps; from certain effusions of blood in the meninges or in the brain; from obstructions to the entrance of air into the bronchi, in consequence of mucosities of more or less extent accumulated at the back of the throat; and, lastly, from original weakness of the infants, in consequence of their premature birth, and of an alteration in their constitution by serious disease in the mother, or by frequent uterine hæmorrhages in the course of pregnancy.

Forms.

This stage of asphyxia, or of apparent death, presents the different appearances well described by MM. Paul Dubois, Naegèle, Cazeaux, &c.; appearances which result from the very causes of the disease.

Sometimes the absence of respiration is the result of congestion of blood in the brain, in consequence of an obstacle to the circulation, which thus causes a stasis of blood in the interior of the skin, and the children are livid, purple: this is what I term the apoplectic state of infants, or *apoplectic asphyxia*.

Sometimes the absence of respiration is the result of the pure and simple compression of the brain by an obstacle in the pelvis, or by the forceps, and the children, half dead, remain pale; this is *ordinary asphyxia*.

Sometimes this state is caused by hæmorrhage of the cord or of the placenta, or by natural weakness, the consequence of diseases of

the mother, or of a premature accouchement, and the appearances are very nearly the same as in the preceding case, with slight shades of distinction.

There are, then, two forms to be distinguished in the asphyxia of infants, the *simple ordinary form* and the *apoplectic form*. But in all these circumstances the primary cause is the same, and this cause is the absence of nervous influence, which impedes the respiratory movements, arrests hæmatosis, and determines death.

Symptoms.

In the apoplectic asphyxia of infants, the surface of the body appears swollen, and is of a violet or rather a bluish black colour; this is more decided on the superior parts of the body, and especially on the face. The muscles are motionless, the limbs preserve their flexibility, the body its heat, and as MM. Cazeaux and Jacquemier have remarked, the pulsations of the cord, of the pulse, and even those of the heart, are sometimes obscure and hardly perceptible.

In the ordinary asphyxia, this colour does not exist; the children, as M. Paul Dubois remarks, present the paleness of death; their skin is sallow, often soiled by the meconium; their lips flaccid, the limbs pendant, the lower jaw depressed, the pulsations of the cord feeble, and nearly entirely absent. The newly-born child which presents these symptoms, has sometimes performed movements, and even cried at the moment of its birth, but it has soon fallen into a state of apparent death.

Between these two principal types there are shades of distinction, and other less decided forms may be observed which establish a sort of transition between *apopletic asphyxia* and *ordinary asphyxia*.

Diagnosis—Terminations.

This morbid state lasts a greater or less time, and it may easily be mistaken for death itself, as has several times happened. This may be imagined at the time when the certain signs of death were not well understood; but now, however severe the symptoms may be, there is no room for mistake. Formerly it was not known whether in this condition the pulsations of the heart of the children were maintained or not; now, as I have demonstrated by numerous facts, in my treatise on the signs of death, it is ascertained that the pulsations of the heart cannot disappear, and be completely interrupted without death being the consequence. It follows, then, that in the asphyxia of infants, as in all cases of apparent death, if there is a doubt, it is sufficient, in order to clear it up, to carefully auscultate for five minutes all the parts of the precordial region, to determine if the pulsations of the heart have really disappeared. After a negative exploration, we

may be assured of death. If, on the contrary, feeble pulsations are distinguished, every means should be put in force, in order to reëstablish them, and it is only then that success is possible, as MM. Moreau, Cazeaux, Chailly,* Jacquemier, &c., have fully proved.

The asphyxia most frequently terminates in recovery. However, a certain number of children die. In these there is always found a more or less decided congestion of the cerebro-spinal apparatus, a congestion which is moreover very common in children who die during birth.

Anatomical Lesions.

According to Billard, the injection of the meninges, of the spinal cord and of the brain, is so common in the infant that he almost considers it the normal condition, rather than a pathological change. He has observed it in the greater number of the bodies of children who have died of the asphyxia which he calls apoplectic, and often also it is combined with an effusion of blood in the inferior extremity and posterior part of the spinal cord. At the same time Billard observes that he has remarked this change without its having occasioned appreciable symptoms during life.

When the capillary injection is of great extent, as, for example, in the apoplectic asphyxia, an effusion of blood soon takes place on the surface of the meninges, and the blood which is the result of this effusion usually coagulates in large quantity, compresses the brain or spinal cord, and is the cause of the state of stupor and depression which the children present. This hæmorrhage has been observed by M. Cruveilhier in nearly all the children which have died of this asphyxia. It is especially observed towards the posterior lobes of the brain, around the cerebellum and the spinal dura mater. It is also noticed, but rarely, in the ventricles and in the substance of the brain. Billard has, however, reported an example of this kind. The cerebral pulp is usually the seat of a considerable injection, under the form of a spotted or granular redness, chiefly upon the lateral parts of the corpora striata and of the optic thalami.

Amongst these children ecchymoses in the lung, in the thymus, and decided congestions of the various abdominal viscera are sometimes observed.

Treatment.

As may be observed, the asphyxia of newly-born infants is a very dangerous and very serious state, which should be promptly treated, and by the various means which are suitable to the different indications which the situation of the child demands.

* *Traité pratique de l'art. des accouchements.*

In the first form which I have admitted, that is to say in the *apoplectic asphyxia*, the engorgement of the brain and other organs must be relieved. The umbilical cord should be cut, and two or three spoonfuls of blood allowed to flow. The respiration begins to establish itself if there are no obstructions in the mouth, which should be always well examined. The finger should be insinuated in order to remove the mucosities which may be found there accumulated. The purplish blue tint of the skin gradually disappears, at first in the lips and face, and soon afterwards in the rest part of the body.

If the blood cannot flow from the cord, the child should be put into a tepid bath to encourage the flow, and if that does not succeed, a leech should be put behind each ear, over the mastoid process, and the bite should not be allowed to bleed after the fall of the animal.

In the second form, that is to say in *ordinary asphyxia* which is exempt from apoplectic symptoms, the loss of blood is useless, and the umbilical cord should not be allowed to bleed; if the children are anæmic this would be an operation replete with danger. In these cases the ligature should be placed upon it and the cord divided in the usual manner.

In the two forms of the asphyxia of new-born children, all possible means should be used to stimulate the action of the respiratory movements. To effect this, all the exterior excitants have been employed. Frictions, baths, douches, &c., have in turn been put into practice. The child should be placed in a tepid bath or in a bath prepared with the decoction of aromatic plants, or still better in warmed linen or before a clear fire. It should be gently rubbed with a portion of flannel or with the fingers; this failing, it should be smacked on the buttocks with the hand, and this flagellation always produces a good effect. The frictions may be either dry or performed by means of a flannel impregnated with irritant liquids, such as vinegar and brandy. These liquids are also made use of to excite the nostrils or the interior of the mouth. The employment of ammonia is often attended with danger.

The precaution should also be taken, from the commencement of the operation, to inspect the interior of the mouth in order to remove by the finger the mucosities which may be there present.

When all these means are of no avail, some douches with vinegar or with brandy and water should be made over the chest; the attendant fills his mouth and forcibly projects this liquid on the walls of the chest, at the same time exerting lateral pressure on this cavity to replace the action of the paralysed muscles. Some persons recommend the application of the mouth over that of the child, and to blow into the back of the throat. It is much better to practise the insufflation by means of a bent tube introduced into the larynx. This operation

should be performed with the greatest precaution; care should be taken not to make a mistake in the situation and not to blow into the œsophagus, and also not to dilate the lungs beyond measure, and determine pulmonary emphysema. To effect this, the laryngeal tube of Chaussier, the form and general disposition of which are very appropriate, should be used, as Dugès, Madame Lachapelle, and more recently M. Depaul, recommend.

The index finger of the left hand is carried on the epiglottis and serves as a guide to the laryngeal tube which the right hand pushes towards the aperture of the larynx, so as to penetrate their passing in front of the epiglottis. As the instrument may be in the œsophagus, lateral motion should be given to it to discover if it drags the larynx along with it. Besides, if it is in the œsophagus from the first insufflation, the rising of the epigastrium by the gas is observed, which should then be immediately arrested.

It is useful to press a little upon the larynx with the instrument in order to depress the œsophagus, or to close the nostrils and the lips with the fingers, then from ten to twelve insufflations should be performed in a minute, at the same time slightly pressing upon the chest to assist the egress of the air. These insufflations may be prolonged for a quarter of an hour, half an hour, or as long as it is imagined that on auscultation the unfrequent pulsations at the precordial region can be distinguished. When the beatings of the heart have completely disappeared, and when the ear applied to the chest for some minutes can distinguish nothing, all further efforts become useless, for there is no example of a parallel case in which reanimation of the child has succeeded; this is also the advice of those experienced accoucheurs whose observations have been previously quoted.

Electro-puncture of the diaphragm and of the intercostal muscles has also been recommended. This means may be useful, and has succeeded in a great number of cases.

It is especially important to prolong the attempts with the greatest perseverance. We should not soon give up, but as I have previously remarked, should continue our exertions for an hour or more, so that we should only leave the child when we are assured of the complete and certain disappearance of the movements of the heart, or in other words when it is impossible to restore it to life.

[The following illustration is quoted from a paper (*Journal fur Kinderkrankheiten;* Ap., p. 397) by Dr. Marchant (de Charenton), in answer to the question proposed by the author, as to how long asphyxia can continue without producing death. Dr. Grénet de Barbezieux relates in the *Presse* of November 29, 1851, the following circumstance: In the year 1844 I delivered a lady in Paris of a child presenting all the characters of five months' gestation. The skin was colourless, the infant motionless, shrivelled, and flabby, and evinced no signs of the establishment of respiration and circulation. Nevertheless, I attempted its resuscitation,

inflating the lungs and applying friction to the skin, but it was all in vain. After four hours, when preparations were made for burying the child, it was observed with astonishment that the skin had a blush upon it; fresh endeavours at resuscitation were had recourse to, and the child soon began to breathe. Death took place in forty-two hours. Dr. Marchant is therefore of opinion that the present state of science does not warrant us in placing any definite limit to the prolongation of viability under the condition of asphyxia, and that we cannot be too cautious in coming to a conclusion as to whether a child be really dead or not. The grand resources of our art in such a case are insufflation of the lungs and the maintenance of the warmth of the body.—P.H.B.]

BOOK VII.

DISEASES OF THE HEART.

Putting aside the vices of conformation, the organic diseases of the heart consecutive to birth are very rare in the infant and children at the breast. Billard simply devotes a few pages to their history, which, in the present state of science, it is still impossible to detail in a satisfactory manner.

The principal vices of the conformation of the heart are—

1. *Acardia*, or absence of the heart, a deformity which is incompatible with extra-uterine life, and which very frequently coincides with acephalia and anencephalia.

2. *Bicardia*, or double heart, which is never met with except in cases of diplogenesis.

3. *Ectopia of the heart*, or displacement of this organ, which includes *transposition of the heart*, which always accompanies the transposition of the other viscera. The heart is observed on the right side, and the direction of the aorta is changed; its thoracic portion descends on the right side of the vertebral column. The heart is sometimes also observed displaced upwards, near the neck and head; this is what Breschet described under the name of *ectopia cephalica;* or, on the other hand, it occupies the abdomen by a congenital aperture in the diaphragm, or in consequence of the absence of this muscle; this is *ectopia abdominalis*, and it has been remarked that some individuals have lived a considerable time with this singular conformation.

[There may be deficiency of the pericardium, occurring generally when the heart lies outside the thorax, although it is also met with when this anomaly is not present. This deficiency is, in almost every instance, merely partial, con-

sisting in the congenital anomalous position of the heart outside the thorax in a fissure of the pericardium. The heart and the left lung lie, as a general rule, in one common, large serous sac, which gives rise, at the place from whence the arterial trunks emanate, to traces of the membrane, in the form of fatty, mesentery-like folds. An excess of formation occurs in double monsters, where the pericardium is found to contain a double heart.

Anomalies of position. The congenital anomalies of position are very numerous, and admit, in part, of being referred to an arrest of development. Many depend on different adhesions of the heart resulting from inflammation in the fœtus; and some, again, on different anomalies of neighbouring organs; as, for instance, on the deficient development of a lung, the partial deficiency of the diaphragm, and the position of the abdominal viscera in the thorax. These anomalies are very various in their character. The following are the most important:

Position of the heart exterior to the body. This anomaly occurs associated with a partial absence of the diaphragm and the abdominal and thoracic walls. When the former of these is absent, the heart is generally situated with all or several of the viscera externally to the body, in a closed or open sac occasionally contained in the sheath of the umbilical vessels.—P.H.B.]

4. *Vices of conformation which lead to the mixture of the venous and arterial blood*, these are—

1st. The heart is simple, composed of one auricle and on ventricle.

2nd. One auricle and two ventricles.

3rd. One auricle and two ventricles, one of which is rudimentary.

4th. One ventricle only, and two auricles.

5th. One ventricle only, two auricles, and the patency of the foramen ovale.

6th. The aorta and pulmonary artery originating in the right ventricle.

7th. The aorta originating from the right ventricle and the pulmonary artery from the left ventricle.

8th. *Idem*, the aorta from the right ventricle, the pulmonary artery from the left ventricle, and in addition the patency of the foramen ovale.

9th. *Idem*, the aorta from the right ventricle, the pulmonary artery from the left ventricle, the patency of the foramen ovale, and in addition the patency of the ductus arteriosus.

10th. *Idem*, the aorta proceeds from the right ventricle, the pulmonary artery from the left ventricle, and the patency of the two orifices of the foramen ovale and ductus arteriosus.

11th. The heart presents an opening in the ventricular septum.

12th. *Idem*, in addition the patency of the foramen ovale.

13th. *Idem*, in addition the patency of the ductus arteriosus.

14th. *Idem*, in addition the patency of the foramen ovale and the ductus arteriosus.

15th. Patency of both the foramen ovale and ductus arteriosus.

16th. Patency of the foramen ovale.

Such are the principal vices of the conformation of the heart which

I have merely enumerated. But in this organ, at the moment of birth, in a well formed child, there is a very important change of function, which is due to the establishment of the respiration and of a circulation independent of the mother. The fœtal circulation disappears, and it is replaced by a new and particular circulation, favoured by the successive obliteration of the foramen ovale and ductus arteriosus. The ulterior regularity of the functions of the heart, and the production of some of its diseases, depend on the manner in which this obliteration has been accomplished. It is, then, important to know how the independent circulation of the child is established, and especially how the fœtal openings, of which we have just spoken, close. Billard has studied this subject with the greatest care, and the following is borrowed from him.

ON THE ESTABLISHMENT OF THE INDEPENDENT CIRCULATION.

"I have most carefully observed the changes which take place in the heart, in the ductus arteriosus, in the ductus venosus, and in the umbilical arteries, during the first days of extra-uterine life. I am now about to point out the result of these researches. I shall successively pass in review, 1st, the epoch at which the fœtal openings are obliterated; 2nd, the manner in which they are obliterated; 3rd, I shall point out the physiological and pathological consequences which naturally result from these researches."

1st. Epoch of the Obliteration of the Fœtal Openings.

"*Children one day old.* In nineteen children of one day old, there were fourteen in whom the foramen ovale was entirely open, in two its obliteration had commenced, and lastly, in two others, it was entirely closed, and no more blood passed through.

"Amongst these same children, the arterial canal (ductus arteriosus) was open and full of blood in *thirteen*, its obliteration had commenced in *four*, and in the remainder it was entirely obliterated. I may observe that one of these last was one of those children in whom there was complete closure of the foramen ovale. The other child observed in the same state had the ductus arteriosus yet open.

"With regard to the umbilical arteries, they were still quite pervious, close to their origin from the iliac arteries; their calibre was diminished in consequence of the remarkable thickening of their walls. Amongst all these children the umbilical vein and the venous canal (ductus venosus) were pervious, and the latter was usually observed gorged with blood.

"It results from this first examination that the foramen ovale and the ductus arteriosus are still pervious the first day of birth in most of the cases, although these openings may be obliterated at this epoch.

"*Children of two days old.* In twenty-two children of two days old there were fifteen in whom the foramen ovale was very pervious, in three it was nearly obliterated, and four presented this opening entirely closed. Amongst the same children I found the ductus arteriosus still pervious thirteen times, a commencement of its obliteration six times, and entirely obliterated three times. In all, the umbilical arteries were obliterated to a greater or less extent, but the umbilical vein and the ductus venosus, although empty and flattened, still allowed the entrance of a rather large probe. These facts clearly demonstrate that most frequently the foramen ovale and the ductus arteriosus are not yet obliterated two days after birth, although the child is obliged to live an independent life. As the umbilical arteries from henceforth become useless, they have already from this epoch undergone the modification which should result from their loss of action.

"*Children three days old.* I have submitted to the same examination the bodies of twenty-two children of three days old; in fourteen of these the foramen ovale was still open, in five its obliteration had commenced, and was complete in the last three.

"The ductus arteriosus was also pervious in fifteen children; its obliteration had commenced in five, and the obliteration was complete in two only. These two subjects at the same time presented an obliteration of the foramen ovale. The umbilical vessels and the ductus venosus were empty and even obliterated in all these subjects. But it is evident that these vessels are obliterated before the foramen ovale and the ductus arteriosus have experienced a complete occlusion; and we may further state that at three days old, the ductus arteriosus and the foramen ovale are not generally obliterated.

"*Children four days old.* I have observed, in twenty-seven children four days old, that in seventeen the foramen ovale was still open. Of these seventeen cases, there were six in which this opening was very large, and was distended by a large quantity of blood. In the other eleven individuals, the foramen ovale was simply pervious. Of the twenty-seven cases to which we are referring, the obliteration of this opening had commenced in eight, and it was completed in the remaining two.

"The ductus arteriosus was still open in the seventeen children; its obliteration had begun, and even only presented a very narrow channel in seven of them; and its obliteration was complete in three subjects: in nearly all, the umbilical arteries were obliterated near the umbilicus, but were still capable of being dilated near their origin from the iliacs. The umbilical vein and the ductus venosus, which were completely empty, were observed very much shrunken.

"*Children of five days old.* Twenty-nine children, five days old, were submitted to the same examination as the preceding; in thirteen

the foramen ovale was still open; but this opening did not exist to the same extent amongst all these infants. It was largely dilated in four cases, and in the other ten it was of a medium diameter.

"This fœtal opening was nearly completely obliterated in ten cases, and the other six it was sufficiently so as not to establish any communication between the two auricles.

"In these twenty-nine children, the ductus arteriosus was observed open fifteen times. Of these fifteen cases, in ten the canal was freely open. The obliteration was very much advanced in the other five subjects; this obliteration was nearly complete, or at least the calibre of this canal only consisted of a very narrow channel in seven children; lastly, in the other seven, the obliteration was complete. As to the umbilical vessels, their obliteration was complete in all the subjects.

"Up to the present time, we have observed that the fœtal openings were still pervious in a considerable number of children, even five days after their birth. None of these children presented particular symptoms which could be referred to the apparatus of circulation. We shall observe this number diminish amongst the subjects of more advanced age than those which have at present occupied our attention.

"*Children of eight days old.* Very decided differences have not been observed between the children of six and seven days old and those whose fœtal openings we have just examined, but it is not the same with children of eight days old. In fact, in twenty subjects which died at this age, in five only has the foramen ovale been found still open. It was incompletely closed in four individuals, and its occlusion was complete in eleven.

"Of these twenty children, there were only three in which the ductus arteriosus was not obliterated; one of them presented an aneurism of this canal, which, in consequence of this aneurismal dilatation, acquired a size equal to that of a hazel nut. Its internal lining presented a rather thick layer, having a fibrinous consistence and a yellowish colour; it was perfectly analogous to those fibrinous layers which line the interior of aneurismal sacs.

"Of these twenty cases, in six the ductus arteriosus was nearly entirely obliterated; and in eleven others its obliteration was complete. In nearly all, the umbilical vessels were completely obliterated; I say, in nearly all, because in five cases neither the umbilical veins nor arteries were examined.

"From this last examination it may be remarked, that at eight days the fœtal openings are very frequently obliterated, but that they may still be found open even at this age; I may add that at twelve, at fifteen days, and even at three weeks, the foramen ovale or the ductus arteriosus may still be found open, without the child thence exhibiting, during life, any peculiar symptoms; for it may be repeated, that I

have selected, for the subjects of these researches, children most of whom died of diseases foreign to the respiratory apparatus.

"From the facts we have just indicated, it results that the fœtal openings are not obliterated immediately after birth; that the period at which this obliteration takes place is extremely variable; that, however, in eight or ten days the foramen ovale and the ductus arteriosus are usually closed. It results, moreover, from the preceding examination, that the modifications which follow the cessation of fœtal existence in the organs of circulation of the infant, take place in the following order: the umbilical arteries are obstructed, then the umbilical veins, the ductus arteriosus, and lastly the foramen ovale. The patency of these fœtal openings for some days after birth should not then be regarded as a disease, since it is commonly met with, and does not occasion any particular symptoms. This irregularity or this retardation is due to the mode in which this obliteration takes place, and this is what we will now proceed to examine.

2nd. Mode of Obliteration of the Fœtal Openings.

"When we examine the disposition which the foramen ovale gradually assumes from the first month of conception to the period of birth, it is observed that the form of this opening, and the respective arrangement of the surrounding parts, and especially of the Eustachian valve, become such that the blood which at first flowed without obstacle, from one auricle to another, gradually experiences more difficulty in flowing on in the course which it for some time followed. Sabatier has especially insisted on this point. Thus, the first modification, developed in the organization of the heart, compels the blood to change its course; the liquid, inert in itself, is in immediate dependence on the motive force which projects it and directs it towards the canals through which it should run. If this is the case, other anatomical modifications must be also developed in the other parts which the blood should abandon, modifications which, by changing the form and altering the mode of action of these organs, impress on the fluid, which runs through it, a change of direction. Now, if the umbilical arteries and the ductus arteriosus are examined according as they are obliterated, it will be observed that their walls gradually thicken. This thickening of the umbilical arteries is especially observable at their point of insertion at the umbilicus; there they often present after birth a kind of fusiform swelling, which operates to the prejudice of the calibre of the artery, and this swelling appears to result from a kind of hypertrophy of the yellow elastic fibrous tissue; whence it follows that the artery possesses at this point a contractile power superior to the effort of dilatation which the column of blood, projected by the iliac arteries, can exert. It is very easy to prove the

thickening of the coats of the artery, by slicing it to the apex of the parts above mentioned; this thickening will be observed to diminish in proportion as the origin of the artery from the iliacs is approached, and it is precisely in this manner that the progression of its obliteration after birth is remarked. Thus, after birth, two causes compel the blood to abandon the course it followed in the uterus: 1st, the establishment of the respiration and of the pulmonary circulation; 2nd, the modification of texture which the umbilical arteries undergo.

"There is a phenomenon which still further proves that the contractility of the umbilical vessels is capable of suspending the flow of blood in their interior, it is this: if the umbilical cord is divided after birth at some distance from the umbilicus, in a plethoric child, a jet of blood is observed to flow with impetuosity, then it lessens, and at last stops altogether; if a fresh portion of the cord is divided, a fresh jet of blood flows, and then ceases. This hæmorrhage may be renewed at each successive section of the cord. M. P. Dubois informs me that he has verified this fact a great number of times. Now, the course of the blood is arrested thus, because the arteries of the cord contract upon this liquid and compel it to retrograde. If there exists near the umbilicus and within the abdomen a more contractile portion of the umbilical arteries, in consequence of a greater quantity of fibro-elastic tissue being present, it may be conceived that the course of blood in the fœtus becoming less impetuous when the repose which comes after the accouchement begins to be established, these arteries may be capable of opposing the access into their interior of the fluid blood which they push back, and the force of which they overcome; in proportion as the child ages, the artery becomes more obliterated, and in consequence of its being submitted to traction, through the progressive enlargement of the abdominal walls, it entirely loses its vascular form, and is transformed into a ligament.

"The change which takes place in the umbilical arteries is also observed in the ductus arteriosus. In the embryo, it presents a flexibility as great as that of the other arteries; it permits itself to be easily dilated by the column of blood which runs through it, and this flows without any obstacle into the aorta; but at birth, and after this period, the walls of this canal become gradually thickened; a sort of concentric hypertrophy is developed in it, which, without apparently diminishing the size of the vessel, does really diminish its calibre, whence it results that the blood, driven from the canal, entirely passes through the pulmonary arteries. When the ductus arteriosus has experienced the above mentioned hypertrophy and obliteration, I cannot give a better idea of the form it presents than by comparing it to the tube of a pipe, the fracture of which is very thick, and only presents at the centre a channel of moderate calibre.

"The obliteration of the umbilical vein and of the ductus venosus does not take place in the same manner. These vessels do not present, like the preceding, a considerable thickening of their walls; from the instant the umbilical cord has been cut, the vein of this name is no longer capable of receiving blood in its interior, unless this takes place by regurgitation from the inferior vena cava. Then its walls become flattened, and close together; they become contiguous, and its calibre ends by being obliterated, as is observed in all vessels of whatever nature they may be, as soon as they are no longer traversed by the fluids which habitually run through them. However, the umbilical vein and the ductus venosus still preserve their cavity free; for they may be readily distended by introducing a sufficiently large probe, which is not the case with the umbilical arteries and the ductus arteriosus. In these vessels an active obliteration has taken place, if I may use this term; the blood has been compelled to abandon them in consequence of the organic modifications developed in the texture of their walls, while, as regards the umbilical vein and the ductus venosus, the obliteration is, so to speak, passive, that is to say, is consequent upon the absence of blood; it is the result and not the cause of the driving back of the stream of blood.

"This difference is undoubtedly the consequence of the difference of structure in the arterial and venous system. If it is necessary that the foramen ovale and the ductus arteriosus undergo organic changes which prepare for, and lead to, their obliteration, it may be readily conceived that nature, so fruitful in anomalies, may prepare these modifications, sometimes prematurely, sometimes more leisurely, according to the individuals. Thence the cause of the obliteration of the fœtal openings from the first days of birth in some children, and of the patency, on the contrary, of the foramen ovale, and of the ductus arteriosus in some others to a more or less distant period after birth; thence, indeed, the necessity of a longer or shorter period of time in most of the cases to complete this obliteration. Thus are explained the irregularities of the period of the complete establishment of the independent circulation, without the necessity of considering them as the cause or as the effect of certain diseases of the heart and of the lungs.

"However, from the accomplishment of these phenomena of transition, an incomplete oxygenation of blood must undoubtedly result, since all the fluid which the heart projects afar into the different parts of the body has not previously traversed the lungs, and has not been placed in contact with the blood which has been renewed by the child's respiration. But, after all, is it necessary that the blood of a child which is just born should be as much oxygenated as that which circulates in the arteries of an adult? On the contrary, is it not proper that

the scarcely sketched outline of the organs of the babe should not receive too active a blood, and that the materials of nutrition should not be all at once charged with exciting principles, the action of which, on the organs of the child, would undoubtedly prove prejudicial to its health, and be even hurtful to the progressive establishment of independent existence? I believe so, and know not how these opinions can be rejected, which, moreover, result from the anatomical examination of the organs of circulation of the new-born child. There is yet another consideration which comes to the support of these assertions: it is that the lungs would be exposed to fatal congestions, if all at once the pulmonary arteries poured into them all the blood which flows through the heart. The ductus arteriosus, by permitting the superabundant fluid to penetrate its calibre, comes to the succour, thus to express it, of the respiratory organ, the congested state of which would not allow the air to arrive freely into its cells, so that the establishment of independent existence is observed to be favoured even by the continuance of the organic dispositions which belong to fœtal life. Thus, everything in the organization is linked together, both the disposition of the parts and the exercise of their functions; thus everything follows in the order, and by the transitions ordained and prepared by nature, so that no sudden and unexpected change should occur to interrupt the uniformity and the harmony of the phenomena of life."

If the fœtal openings remain open much beyond the period pointed out, a more or less complete mixture of the arterial with the venous blood may result, and thence the bluish colour of the skin, which has received the name of cyanosis. We will now say a few words on this subject.

3rd. On the Cyanosis of Infants.

The cyanosis of infants is characterized by a bluish colour of the integuments, due to the admixture of arterial and venous blood. This constitutes *cardiac* cyanosis; it develops itself some days, or at the latest one month, after birth; when this epoch is passed, cyanosis in the infant is very rare, and comes on in accidental manner in consequence of peculiar circumstances which cause disease of the heart, and determine the abnormal communication of its cavities, or obstruction to its circulation. This disposition is hereditary like the organic lesions which produce it, and it is much more frequently met with amongst individuals of the male sex than among others.

In the young child, cyanosis always results from obstruction to the venous circulation, and from the admixture of the two streams of blood caused by the various organic alterations of the heart which I have previously pointed out, when treating of the defects in the conformation

of this organ. There is usually only a communication of the auricles by the foramen ovale, or a communication of the ventricles. This is the most common case, and is that which is the most compatible with the maintenance of life.

Cyanosis is attended by a bluish colour of the lips, of the face and extremities, afterwards the blue tint involves the whole surface of the body. The conjunctivæ are injected, the eyes prominent, the respiration calm but constrained in its movements; sometimes there is dyspnœa and accessions of suffocation if the children are incautiously disturbed; there is a tendency to weakness and syncope; the slumbers are light and often interrupted by sudden awakings; the warmth of the body is feeble, and the temperature is lowered to 91° or 97° Fah.

In the only example I have had the opportunity of observing, the symptoms I have just described were present; in addition, when the hand was placed on the precordial region, a slight vibratory thrill was perceived without a corresponding bellows sound being clearly detected by the ear. To me this abnormal bruit remained doubtful, and I am not aware whether time developed it, for the child is dead. There was not, in addition, dulness at the precordial region.

The cyanosis of infants which results from the admixture of the two streams of blood, and which may be termed cardiac cyanosis, should be distinguished from the bluish colour of the integuments which sometimes comes on in the asphyxia of capillary bronchitis, or of suffocative catarrh, and in certain convulsive diseases. These bluish tints constitute accidental cyanoses; they are ill defined, and are sometimes designated under the name of *pulmonary cyanosis* and *encephalic cyanosis*. These kinds of cyanosis have no resemblance to *cardiac cyanosis*. This last comes on gradually, at a greater or less time after birth; it is permanent, and increases slightly every day. The dyspnœa does not always exist, it only comes on in paroxysms, and is never the consequence of convulsive movements.

The cyanosis of infants should then be considered as a very serious phenomenon, in consequence of its organic cause. It forebodes numerous serious symptoms, a very considerable feebleness of health, a continual morbid state, interrupted by palpitations, suffocations, and syncopes, before the slow approach of death. As may be observed, it is one of the most distressing phenomena we can meet with in an individual. However, if most of the subjects die early, some few may live; one case which is now under my observation, has arrived at the age of eleven years; there are some who live to twenty, thirty, and according to J. P. Frank, to fifty-seven years of age. It is said that a case has been known to recover, after an hæmoptysis, but this event is much more rare, and should be interpreted in a different manner than has been done.

[Of nineteen males and fourteen females who died of cyanosis in London in 1849, nineteen males and eleven females died in the first year; of the three remaining females, one died in the second year, one in the fifth, and one in the twenty-fifth year.—P.H.B.]

The cyanosis of infants, which thus depends upon the communication of the cavities of the heart and of the admixture of the two streams of blood, is a disease which time alone can cure, in consequence of the efforts of nature, and if the obliteration of the fœtal openings takes place so as to effect this. Consequently there is no motive to make use of any active treatment. It is simply necessary to regulate the regimen of the children, to allow them only to suck every three hours, not to confine them in too warm an apartment, not to toss them about violently, and if they live, not to excite their joy by sudden and fatiguing means. They must not, however, be allowed to get chilled, for it is known that they have a great tendency to chilliness. Moreover the bowels should be kept free by means of slight purgatives administered at frequent intervals.

4th. On Hypertrophy of the Heart.

This lesion is very rare; Billard has reported two examples of it under the name of passive aneurism of the heart. One was observed in a child two days old, which died from pneumonia, with an enormous dilatation of the right ventricle, of the right auricle, and hypertrophy of the left ventricle. The other example took place in a child five days old, which had at the same time an aneurism of the ductus arteriosus. A precisely similar case has been observed by Baron. Hypertrophy of the heart has also been remarked by M. Cruveilhier in a child of five days old, born in the eighth month of pregnancy. The disease was congenital. It was an aneurism of the right cavities of the heart with obliteration of the orifice of the pulmonary artery.

The following is a still more curious case which occurred at the Hospital of St. Antoine, and which permitted the child to live until the eighth month; it is an example of hypertrophy of the ventricles with communication of the cavities of the heart and displacement of the aorta, which opened into the ventricles. It has been communicated to me by M. Thieberge.

Case. The patient, Joseph Paihrel, eight months of age, was admitted the 22nd of March, 1851: No. 8, St. Paul's ward, and he died the 13th of the following April.

During the first five months of his existence he enjoyed pretty good health, took the breast well, did not cough, but had occasional attacks of suffocation. Since three months he has often had dyspnœa; the attacks of suffocation have been more frequent, and emaciation has come on.

Since the 22nd of March the digestion is good; the child sucks regularly.

From the 10th to the 13th there was an abundant greenish diarrhœa.

The face is habitually pale, the child is not subject to syncope nor to coldness of the extremities. The pulse is frequent, regular; the beatings of the heart are frequent, tumultuous, they are not accompanied by any abnormal sound; there is no cyanosis.

The emaciation has not increased. Nearly every day, without an appreciable cause, the child is seized with an attack which lasts from some minutes to one hour, and is characterized by great dyspnœa, very violent pulsations of the heart, blue countenance, livid lips.

The child died on the 13th of April, at eleven o'clock in the evening, from an attack of suffocation.

Autopsy. April 15th, 1851, at nine o'clock in the morning.

The heart is very large, three and a half inches from the base to the apex, ten inches in circumference at the base.

The auricles and ventricles are distended by clots. The walls of the auricles are thickened, those of the ventricles are hypertrophied; they are .39 inch in thickness.

The septum of the ventricles is 1.17 inch in height and half an inch in thickness at the apex of the heart.

On introducing a probe into the fossa ovalis it penetrates into the auricle of the opposite side, by the orifice of the foramen ovale, which has a diameter of .39 inch.

The septum of the ventricle diminishes in thickness from the ventricular cavities to their base; it ceases to exist at about .78 inch from the inferior wall of the auricles, thus interposing between the two ventricles an abnormal orifice of .78 inch in diameter.

The pulmonary artery does not present any alterations in its valves; it has the consistence of an artery.

The aorta at the base of the heart and at its exit from the left ventricle is half an inch in diameter; this artery enters normally into the left ventricle.

In consequence of the incomplete development of the ventricular septum, the aorta is observed across the two ventricles. It corresponds on one side to the left ventricle, and on the other penetrates into the right ventricle by the side of the tricuspid valve.

The sigmoid valves are healthy.

The auriculo-ventricular valves are in a normal state.

The thymus is very small.

The lungs are collapsed, slightly congested, and on insufflation assume their normal volume and appearance.

All the cases of hypertrophy of the heart to which I have just referred are the result of vices of conformation, and have their origin in intra-uterine existence. Here is one of the most curious, and one which probably developed itself after birth. The following is the extract of the case.

A little girl, eight and a half months old, was admitted into the Necker Hospital for a long standing pneumonia; she died at the end of ten days.

Besides the numerous alterations in the pulmonary parenchyma, numerous adhesions of the pleura were observed, and the pericardium was enormously distended in order to contain the heart, the dimensions of which were considerable.

This organ was about three times the size of the fist of the subject.

The walls of the ventricle were considerably thickened, and the ventricular cavity very much diminished. The orifices were free.

The right ventricle did not present any thickening of its walls, nor any alteration in the diameters of its cavity. It was then, as may be observed, a concentric hypertrophy of the left ventricle.

The symptoms which would lead to the diagnosis of this disease were, on one part, the enormous projection of the precordial region, and the rhythm of the beatings, which were rather strong but slightly resounding, and rather distant to the ear. They were, besides, difficult to make out, on account of the respiratory bruit and the movements and cries of the child, who was much agitated by the examination to which it was subjected.

5TH. ON PERICARDITIS.

In young children inflammation of the pericardium is more common than the other inflammations of the heart. It is not less difficult to discover during life. It is scarcely to be recognized except in the dead body.

Billard, who has observed seven well characterized cases of pericarditis, considers this disease as the result of the too great activity occurring in the functions of the heart at the time of the establishment of the independent circulation. I have seen one case in a child one month old, who died of erysipelas and peritonitis. M. Thore has observed another case in very analogous circumstances; the child had at the same time a peritonitis and a double pleurisy.

When the pericarditis is exempt from the complications I have just pointed out, when it exists alone, the children, according to Billard, appear to experience acute pains, they utter a distressing cry, the respiration is obstructed and sometimes suffocating; the countenance pinched; the muscles of the face appear to be continually contracting. Sometimes the limbs are agitated by convulsive movements.

Notwithstanding these phenomena, Billard is rightly of opinion, that it is difficult to diagnose the pericarditis of infants. The pulse, percussion, and auscultation do not furnish any special character; and as the children die very rapidly, the diagnosis can only be formed from the autopsy.

In the children who die, a sero-albuminous and sanguinolent effusion, whitish flakes adherent to the surface of the heart, and very slight adhesions between the two layers of the covering of the organ, are observed in the pericardium.

The pericardium and the surface of the heart are the seat of a more or less considerable injection numerous petechiæ, and of adherent false membranes which are sometimes very compact.

It is a very serious disease, and one which there is reason to believe is always fatal.

[Diseases of the heart are much more rare in children than in adults, and even when present their attendant symptoms are so slight that their existence may be overlooked, until their serious results direct a more strict investigation. Pericarditis, consequent upon an attack of acute rheumatism, is the more common form; the general and physical symptoms are the same as in the adult, and the treatment required is identical, the doses of the remedies employed being proportionally reduced to the ages of the patients. Both endocarditis and pericarditis may arise in the child independent of the rheumatism, are observed as sequelæ of scarlatina, as complications of pleurisy, and as purely idiopathic affections of which West gives illustrative cases.

Of sixty-two males and fifty-two females who died in London, in 1849, of pericarditis, five males and six females were under five years of age.

Idiopathic endocarditis appears to be governed by the same laws and to give rise to the same symptoms as when it complicates acute rheumatism. The phenomena which indicate the commencement of endocarditis are very slight and obscure; a slight febrile movement which subsides in a little time, the respiration is somewhat acelerated and possessing the peculiar character noticed in pericarditis; obscure pain in the precordial region, and some difficulty in lying on the left side, may be all the symptoms developed.—P.H.B.]

BOOK VIII.

ON DISEASES OF THE MOUTH.

CHAPTER I.

ON DISEASES OF THE LIPS.

1st. Adhesion of the Lips. Contraction of the Mouth.

Absence of the buccal cavity, *astomia*, has been observed by M. Laroche in cases in which the bones of the face are arrested in their development, and especially when the lower jaw is wanting. It is an incurable deformity, and the child which presents it very soon dies.

A small irregular opening which will scarcely admit the quill of a pen sometimes exists in the place of the mouth. The buccal cavity is regularly formed and the adhesion of the lips is the sole cause of its occlusion. It is a morbid process accomplished in the mother's womb, a greater or less time previous to birth.

If the adhesion is extensive, an artificial mouth should be made by

a properly directed incision, and the operation is successful if there is no contraction and induration of the lips.

When the mouth is well formed, the lips soft, supple, and only united by slight adhesions, a simple incision by means of scissors will suffice to reëstablish the orifice of this cavity.

2ND. MUCOUS TUMOUR OF THE LIP.

A congenital disposition of the lips which is characterized by the presence of a mucous tumour, situated on the internal surface of these parts, is especially observed in the upper lip.

This tumour, of oval shape, directed transversely, causing a more or less considerable projection, only appears at the time the mouth is opened, and has a very unprepossessing appearance. This tumour increases the size of the lips, exposes them to fissures and ulceration under the influence of the winter's cold. It should not be left, and its removal by a cutting instrument should be recommended to the parents.

The proceeding for its removal is very simple; we should wait until the age of six or seven years before it is put in force. The excision of the tumour should be made with curved scissors, while an assistant holds the lips apart, and the wound should be dressed with charpie moistened with the hæmostatic water of Tisserand or of Brocchieri.

3RD. ON HARE LIP.

The name of hare lip is given to the congenital division of the lips. It is a defect of conformation. There is, however, an accidental hare lip which results when the edges of the traumatic division of the lips have separately cicatrized each on its own side. I shall not treat of this here, but shall solely confine myself to the congenital hare lip, a very common lesion in infants.

Congenital hare lip is the result of very obscure causes, the action of which is very hypothetical. It may be the consequence of an acute moral impression. Thus M. Moulin relates that a woman in the fifth month of her pregnancy, was much startled by the sight of a hare which her husband skinned in her presence. During the last months of pregnancy, her imagination presented to her this skinned hare, and she did not at all doubt but that her child would be subject to a hare lip. She asserted it to her medical attendant, and the prediction was verified by the event. M. le Professeur Roux has observed a precisely similar fact.

Hare lip is sometimes hereditary; Blaudin and MM. Morel and Demarquay have reported some examples of this.

Whatever may be the nature of these moral or hereditary impres-

sions, if it is definitely asked what is the cause of this division of the lips, it is seen that it must be sought for in the evolutions of the fœtus at the different ages of the intra-uterine existence. The force of growth which presides at the disposition of parts, at their juxta-position, at their reunion, interrupted in its efforts, ceases to act, and the lips formed from three points of increase, one median and two lateral, which this force incites to fusion, remain separated, so as to resemble the lip of the hare. When the reunion does not take place at all, the hare lip is double; when it takes place between two of these points only, the median and a lateral, the hare lip is single and is only observed on one side of the mouth.

M. Velpeau and M. Cruveilhier do not admit this theory of the formation of hare lip, by an arrest of the primary force charged with the formation of the tissues. They believe that hare lip is simply the result of an intra-uterine disease of the lips which leads to the division of these parts.

Congenital hare lip presents several anatomical forms. Firstly, the division is always situated at the upper lip. There are only two exceptions to this rule reported by Christopher Seliger and Nicati. It usually only involves the lips: this is *simple hare lip;* the division is either *single* and *lateral*, or else it is *double*. In the first case the division exists below the right or left nostril; in the second there is below each nostril a fissure separated by a cutaneous tubercle.

In other cases the fissure of the lips is accompanied by fissure of the maxillary bones and division of the arch of the palate; this is what is termed *complicated hare lip*.

1. The *labial hare lip* is either complete or incomplete. The fissure extends to a greater or less height even into the nostril. When the division is single, it is always lateral, and forms a considerable separation, gaping below, the rounded angles of which are drawn by the muscles of the lip and allow the teeth and gums to be seen. The lips are very frequently atrophied, but without real loss of substance, although the contrary opinion was for a long time maintained.

When the hare lip is double, but always only involving the lip, this is divided into three portions, a median and two lateral. There are two fissures which descend from each nostril, and which are separated by a median tubercle, more or less large, and depressed. The deformity is well represented by the shape of the letter Y. One of the children on whom I operated at the Necker Hospital, presented this form. The edges of the buccal fissure are rounded off and atrophied. The nose is sometimes flattened and deformed when the fissure extends as far as the nostril.

The simple hare lip, *single and double*, lasts as long as the individuals live, and leads, in time, to the deformity of the maxillary bone, which becomes flattened and allows the projection of the incisor teeth in front.

2. The *complicated congenital hare lip* may be single or double like the preceding.

There may also exist at the same time as the labial fissure, a fissure of one of the alæ of the nose, separation of the palatine plate, either in front only or in its whole extent; separation of the plate of the palate, and of the velum of the palate; an acquired or congenital projection of the bones on which the diseased lip rests, and of the median tubercle; lastly, absence of the palatine plate and of the os vomer.

The most usual complication, and that which the surgeon may alleviate, is the following. The fissure of the lip may also extend to the maxillary bone. It is a separation on one side of the maxillary bone; if the same is repeated on the other side, the two divisions represent a V, the opening of which is directed forwards, and the angle corresponds to the anterior palatine foramen. These two divisions sometimes are united into one only, which traverses the median line. The hard portion of the palate is then separated into two halves as far as the velum, which may itself be separated into two portions. The mouth then communicates with the nasal fossæ by an opening which extends from the lips to the pharynx. Sometimes the clefts coalesce in front, and the median tubercle is wanting; it is in this which constitutes *wolf mouth.*

Labial hare lip is attended with the inconvenience of impeding the pronunciation, and hindering the articulation of those consonants called explosive—the *b*, and the *p*, the *v*, the *f*, and the *m*, &c.; it has also the inconvenience of being an obstacle to sucking. The *complicated hare lip* hinders mastication and deglutition by favouring the passage of the liquids into the nasal fossæ. It is a deformity which should be relieved as soon as possible.

Treatment.

The treatment of hare lip consists in a surgical operation, which is easily performed. Dionis, Garengeot, Boyer, and Sanson, were of opinion that hare lip should not be interfered with before the age of six or seven years; others recommend that it should be operated on a little more early; and, lastly, some, amongst whom may be found Busch, M. Bonfils, and, more recently, M. Paul Dubois, recommend the operation to be practised as soon as possible, even from the first or second day after birth. In a very interesting essay, M. Dubois* has decided this practical question with the consummate judgment which is observed in all his works. He has demonstrated, by facts, that the operation is not more to be feared when performed at this

* *Mémoire sur le bec-de-lièvre et le moment le plus opportun pour l'opérer. Bull. de l'Acad. de Méd.* Paris, 1845; t. x, p. 760.

age than at a more advanced period, and that then also the deformity of hare lip is more easily remedied. As the operation only diminishes, without preventing, the movements of suction necessary for nourishment, many surgeons are now agreed to operate immediately after birth.

Up to the present time the immediate operation for hare lip has scarcely ever been performed, except in cases of hare lip without complication. Should it be the same in the cases of complication? Yes, certainly. Thus, MM. Danyau and P. Dubois have succeeded in a case in which there was a simple hair lip with fissure of the anterior half of the plate of the palate. A physician of the Oise, M. Boudon, was also successful in a case of double congenital hare lip with deep fissure of the palatine plate, which rendered sucking impossible. It was exceedingly difficult to make the child drink from the spoon; the liquids were, in a great measure, rejected out of the lips. The child was only some days old when it was brought to M. Boudon, and it was operated on four days after birth. The edges of the labial fissure having been made raw by an incision, were united by the twisted suture. The first threads were removed at the end of twenty-four hours, and replaced by other threads less tight than the first. This dressing was renewed every day until the removal of the pins, so that the constriction was gradually diminished. The pins were not withdrawn until the cicatrix appeared rather firm. The operation did not cause any bad symptoms, and was crowned with complete success. One of my friends, M. Guiet, has also succeeded in a much more severe case in a child afflicted with double hare lip, and complicated on one side by the entire fissure of the hard and soft palate. The operation was not performed until the twentieth day; it was necessary to have recourse to it twice, in consequence of the detachment of one of the sutures, and yet the hard palate is united, and the neighbouring part of the velum palati to a small extent.

Consequently it is my opinion that we should not hesitate; whether simple or double, complicated or not, hare lip should be operated on in the twenty-four hours which follow birth.

Operation. When it is decided on operating after birth, it is proper to prevent the children from sleeping a sufficiently long time previous to the operation, so that immediately afterwards they may fall asleep.

The operation consists of two stages, the paring and the reunion. The paring is done with scissors, in the following manner. The operator, placed opposite the child, sits in front of an assistant who holds the head, pressing the cheeks forward, so as to compress the facial arteries on the inferior maxillary bone in front of the masseters.

He seizes the angle of the division of the lips with hooked forceps, then with one cut of the scissors he at once removes the red edge of the solution of continuity from below upwards, as far as the superior

angle. The same is done on the opposite side, care being taken that the first incision is met. He thus removes a double angular flap which makes raw the edges of the hare lip fissure. Care should be taken to excise just upon the point of reunion of the skin, with the red edge of the solution of continuity.

As soon as the paring is finished, the surgeon should reunite the edges of the wound as completely as possible. It is done by means of pins and thread.

The first pin, either an ordinary or a special one, should be placed at the base of the division, near to the free edge of the lips. It should pierce at least a quarter of an inch of the pared border, and, directed obliquely, should protrude near to the mucous membrane; then, entering the opposite side, on the edge of the mucous membrane, it should appear on the skin about a quarter of an inch distant from the edge of the fissure. A piece-thread is placed on these two ends of the pin and given in charge to an assistant. The second pin should be placed immediately below the superior angle of the wound, and if a third pin seems necessary, it is placed between the two others.

The pins should be applied in a parallel direction.

When the needles or the pins are applied, the thread is put on so as to embrace each needle and to make upon each a twisted suture. The thread should pass from one needle to the other, so as to allow all the wound to be covered. The thread is then fastened to the upper pin; the head and point of these pins are then removed with the scissors.

The threads should not be drawn too tight, but it is necessary that they should keep the edges of the wound closely applied.

Some surgeons apply the pins by piercing perpendicularly the entire thickness of the lip, so as not to leave a foreign body in the tissue to be united. This is a modification which may be useful. Others place a thread on each pin, so as to isolate each suture. I always operate in this manner.

After the operation, some persons direct a bandage to be applied round the head, so as to confine on the cheeks a pad intended to compress them and push them forwards. This means, useful at a more advanced age, is rather injurious in the infant. No bandage should be applied, and the parts should be as the twisted suture leaves them. However, I advise, the separation of the wound should be prevented by the following means: on each cheek should be applied a square piece of linen, the anterior border of which is pierced for threads, those from one side passing into those of the other, they cross over the lips between the needles, and their ends are fixed to the child's cap.

The child should be watched night and day, and they should avoid

making it laugh, cry, or weep. A sedative may be given to keep it quiet. The only food to be given is milk from the breast of the nurse or from the feeding bottle. The adhesion of the edges of the wound does not take place until the second day, and we must wait until the third or fourth before the pins are withdrawn. The upper pin should be withdrawn first; it may be removed on the third day; the second is withdrawn on the fourth day, and the third on the fifth day. In order to remove the pins or needles they should be turned on their axis and drawn towards the operator. The threads remain fixed on the wound, and serve to keep the edges together; and they should be left in that situation until they drop spontaneously. When the pins are being removed, an assistant should press the cheeks forwards; for a cry from the infant might disunite all. After the extraction of the pins, some sticking plaster should be applied to the lip, as in an ordinary wound. At the end of eight or ten days, cicatrization is complete, and cannot be now destroyed.

When the *hare lip is double*, the mode of proceeding is the same, and the two operations are performed at the same sitting. The edges of the solution of continuity and the edges of the median tubercle are pared, unless the latter is too small, in which case it is removed, then the pins are introduced, and the threads applied as in single lateral hare lip.

Hare lip complicated with fissure of the palate, was not formerly operated on. It was considered to be incurable. This is an error. The reunion of the lips, which is obtained by means of an operation, acts as a slightly compressive means on the bones, and the separation of the two maxillary bones, even if as large as to admit a finger, terminates by disappearing.

The operation is practised in the same manner as for simple hare lip. However, if we operate on a child more advanced in age, and provided with teeth so situated as to interfere with the approximation of the bone, they must be extracted.

In the *double complicated hare lip*, the intermaxillary bone and the median tubercle sometimes form a considerable projection. The operation should have for its aim the reunion of the lips and the compression backwards, or the replacement in its position of the too projecting maxillary bone.

This operation should not be performed on the infant; it should be delayed for two or three years.

Formerly the median tubercle was removed, and the lateral parts united. Desault used compression on this tubercle to remedy the deformity, and Gensoul endeavoured to efface it by bending the intermaxillary bone forcibly back by a fracture of its neck. These methods should not be made use of.

Blaudin, in order to restore the maxillary bone to its place, and to

complete the dental arch, has proposed resection behind the incisor teeth of a triangular piece of the bony septum. In this removing from this lamina the greatest part of its resistance, he fixes beforehand the spot where the solution of continuity should be effected, by a fracture easily effected. With scissors, or with a chisel, according to the age of the patient, a V shaped section, open below, should be made, the angle extending high up into the thickness of the cartilage of the septum or of the nose. The section should be proportioned to the extent necessary to make the maxillary bones fall back. After this resection, a transverse slip of diachylon applied upon the lip, replaces the median tubercle of the lip and of the palate. If there are teeth, and they are not in their place, they should be fixed to the molars by gold wire.

We then wait some days to finish the operation; at the end of two or three days the edges of the labial fissure are pared, the pins and the suture are placed as in the ordinary labial hare lip unattended with complication.

The danger of this operation consists in the hæmorrhage which accompanies the first steps. This is the reason why in this variety of hare lip, we must not operate on children of too young an age, in whom a loss of blood might prove rapidly fatal. There are several who have thus died, amongst others one under the care of Dupuytren. In case of hæmorrhage, when the vessel which furnishes the blood is observed, it should be twisted or cauterized.

In the first steps of the operation, too active symptoms of inflammation are also to be feared; in this case we must wait until this local inflammation has disappeared before undertaking the second step, that is to say the union of the labial fissure. In a case operated on by Blaudin, erysipelas followed, and it was necessary to wait twenty-seven days before the commencement of the paring of the hare lip. To sum up: fix backwards the median tubercle, and two days afterwards, if there is no inflammation, finish by the suture of the lips; this is the mode of operating on double hare lip complicated with double fissure of the velum palati.

[Dr. Mason Warren (*American Journal of Med. Science;* No. xxx, p. 337) has published a paper confirmatory of a recommendation he had formerly given, that children should undergo this operation at as early an age as possible, he having frequently resorted to it twenty-four hours after birth, and with better success than in older children.

In *double hare lip* complicated with fissure of the bones and a projecting tubercle, he operates on one side first, and allows that to heal; for if both sides be operated on at once, the tissues are much stretched and suppuration occurs. If one side has united, and a month be allowed to elapse before the second operation, the prominent intermaxillary bone will be found to have become more or less drawn into its place. He prefers sutures to needles as being more easily introduced, causing less irritation,

and can be removed in from forty-eight to seventy-two hours without disturbing the tender adhesions.

Dr. Anselon (*Union Medical;* No. 76) states that a long experience has convinced him that the practice of immediate operation is the best.

Mr. H. Smith advocates the early practice of the operation, and states that it is in those instances where the hare lip is complicated with a more or less extensive fissure in the palate that an early operation for the cure of the former is so imperatively demanded, and is attended with such beneficial results; for in a child only a few days or weeks old, the bones are so soft and compressible, that they are to a great extent influenced by the pressure which it constantly obtains, and in the course of time the fissure becomes either entirely closed or diminished in size to one third or one fourth of its original extent.

Mr. Bateman of Islington, three years since, operated on an infant only four hours after birth. In this case there was extensive fissure in the palate; the child died of hooping cough last winter, and the mother remarked that before death the fissure, which had at birth been "so large that one could put her thumb into it, had contracted so much that it would scarcely admit the edge of a sheet of writing paper."—(*Med. Times and Gazette;* March, 1854.)—P.H.B.]

APHORISMS.

218. Hare lip, *simple* or *complicated*, with fissure of the palate, either single or double, should be operated on early after birth.

219. Hare lip thus operated on at a period very soon after birth, is always cured with less deformity than that of those operations which are deferred.

CHAPTER II.

DISEASES OF THE TONGUE AND OF THE VELUM OF THE PALATE.

1st. Defects in the Conformation of the Tongue.

The tongue may be the seat of numerous defects of conformation. It may be wanting; it may be too large; and lastly, it may adhere to the roof or floor of the mouth.

Congenital Absence of the Tongue.

The tongue is only entirely wanting in cases of absence of the face. In every other circumstance it exists in a rudimentary state, under the form of a tubercle of greater or less size, and adherent to the floor of the mouth. It is the free portion of the tongue which is wanting. According to the degree of this deformity, suction is more or less interfered with, as well as deglutition, and at a later period articulation, if the children survive. Jussieu, however, has seen at Lisbon a girl fifteen years old, born without a tongue, and whose mouth only contained a tubercle three or four lines in

height in the shape of a nipple. She appreciated various savours; mastication and deglutition were slightly difficult, according to the food; the deglutition of liquids took place without difficulty, provided the quantity to be imbibed at one time was not too considerable; she could expectorate freely, and spoke with the greatest distinctness.

Other cases of absence of the tongue after gangrene, consequent upon smallpox, have been observed amongst children by Aurran and Bonamy; and after great difficulties suction, deglutition, and articulation were observed to be acquired anew, doubtless incompletely, but in a manner sufficient for the accomplishment of the functions of nutrition and relation.

The example related by A. Paré* is well known, in which an individual whose tongue was cut off was observed to remain dumb for three years, and afterwards acquired the power of pronouncing some words by putting a small piece of flexible wood in his mouth.

Hypertrophy of the Tongue.

Some children are born with a considerable enlargement of the tongue, which fills the mouth, protrudes through the orifice and hinders suction. Maurant has related a case of this, but in this case there was a tumour of the tongue which contributed to augment its volume.

Sometimes there is only a slight hypertrophy and a projection of the tongue under the dental arches.

The children should be taught the habit of keeping the tongue in, by applying on it, each time that it projects, a little alum or pepper. This will prevent the tongue from being bitten, and its ulterior enlargement.

At the same time the children should be provided with a nurse with large nipples, so as to prevent a too considerable movement of elongation of the tongue. If the nurse has not this configuration, recourse must be had to a sucking bottle, the end of which is of large size.

Lastly, if the hypertrophy is too considerable, and if it is inconvenient to leave the tongue in such a state, excision, or what is much better, ligature of a portion may be practised.

2nd. Congenital Adhesions of the Tongue.

The tongue presents adhesions—1st, with the palate, which is very rare; 2nd, with the floor of the mouth; 3rd, with the lateral parts of the alveolar arch; 4th, by its extremity on the median line by means of the frænum—to this the appellation of *tongue tie* is applied.

3rd. On Tongue Tie.

Beneath the tongue is situated a very delicate membranous fold

* *Œuvres complètes, nouvelle édition, publiée par J. F. Malgaigne.* Paris, 1840; t. ii, p. 608.

directed edgeways, and fixed behind the symphysis of the lower jaw; this is *the frœnum;* it maintains and moderates the movements of the tongue, and prevents its too great elongation. If the frœnum is too short, the tongue cannot be moved, and the point is channeled like the heart of a pack of cards. If the frœnum is too long, the same obstacle exists. This deformity interferes with nourishment by impeding suction and deglutition; it is chiefly contraction of the frœnum which constitutes *tongue tie.*

As J. L. Petit observes, there are many children who are said to have *tongue tie*, yet have it not. We must then learn how to discern its existence. When the finger cannot be passed under the tongue of the child, if this organ cannot be raised to the palate, if the suction of the finger is obstructed, the frœnum is too short, and the child has tongue tie. It must be cut.

However, if notwithstanding all this, the child takes the breast well and sucks easily, the operation is useless.

If, on the contrary, the child takes the breast, seizes the nipple imperfectly, looses from it noisily, constantly makes a noise in sucking in consequence of the impossibility of the tongue clasping the nipple, allows the milk to run over the edge of the lips, it does not suck, and the operation for tongue tie is sufficiently indicated.

This very easy operation presents some danger from hæmorrhage and falling back of the tongue, when it is done by a timid or unskilful person.

The child should be put in a sitting posture, the head thrown back and confided to one who will not be intimidated by the cries. The surgeon raises the tongue with the fingers or with blunt forceps and holds it up. His other hand, armed with probe-pointed scissors, the points being directed downwards to avoid the ranine arteries, rapidly accomplishes the section of the frœnum to the extent of one sixth of an inch at most. The wound does not require any attention, and it is seldom that the child suffers from it after a few hours; it very quickly heals.

Hæmorrhage sometimes follows this operation, where an abnormal distribution of vessels exists, or if the ranine artery or a large vein have been divided. It is kept up by the movements the child makes in suction, which may cause it to be very considerable. The point whence the blood proceeds should be cauterized with the nitrate of silver, sulphuric acid, or the actual cautery, in the shape of a wire heated in the fire. Here, also, the hæmostatic water of Tisserand and Brochieri may be tried.

In order to arrest this hæmorrhage it is sometimes sufficient to place the child in perfect quiet, by preventing, by a very simple process, the movements of suction of the tongue. When the operation is

terminated, in order to prevent the child sucking its tongue, I compel it to keep the mouth open. To ensure this, it is sufficient to send it to sleep by closing the nostrils with forceps like those used to pinch leech bites. The child then respires through the mouth, and at the end of some time the hæmorrhage is arrested. This means, which I have only employed once, was completely successful.

Another accident, more rare, but more peculiar to the operation of tongue tie, is the turning back of the tongue in the pharynx. J. L. Petit has reported several very striking examples of this. This never happens except after too extensive a section of the frænum, and in this case it is a very serious accident which may lead to death by suffocation. By means of forceps the child should be prevented from thus drawing back the tongue; and if that does not suffice, a plate of metal kept in its place by an apparatus should be fixed on the tongue to keep it motionless.

4th. Congenital Fissure of the Velum and Roof of the Palate.

The roof of the palate and the velum palati present several defects of conformation, the disappearance of which surgery can effect.

We observe, 1st, fissure of the uvula alone; 2nd, fissure of the entire of the velum of the palate; 3rd, fissure of the velum and roof of the palate.

Fissure of the uvula alone is very rare; fissure of the velum, on the contrary, is a rather frequent lesion. It is always median and complete; the edges become separated at each movement of the pharynx; they terminate below by the corresponding half of the uvula. Lastly, the fissure may be observed on the velum and on the roof of the palate. It is of greater or less extent, single or double, involving only the hard palate and stopping at the alveolar arch, or comprising the alveolar arch itself. It is often, in fact, allied to the congenital division of the lips, or, in other words, to hare lip.

Lactation is considerably impeded by this lesion; suction, the imbibition of liquids, deglutition, crying, articulation, &c., are very difficult. Sometimes the infants cannot suck, and it is necessary to hold them vertically and press the breast in the mouth. If this means does not succeed, the milk must be given by spoon or from the sucking bottle. Children who have not been able to swallow anything, and who were dying, have been recalled to life by this means.

This deformity is not, then, attended by any danger, if the necessary precautions are employed to make them take nourishment. Nevertheless, as it is attended with great inconveniences, surgery has devised means to cure it. It has given birth to *staphyloraphy*, which M. Roux has been the first to make known.

This difficult and delicate operation cannot be practised in the infant, nor even in the young child. It should only be undertaken in adult age, about the age of eighteen or twenty, when the docility of the subjects may aid the surgeon in his manœuvres, and in the treatment consecutive to the operation. Consequently, I shall no longer dwell on this subject, which belongs to the surgery of adults.

CHAPTER III.

ON THE PHYSIOLOGICAL PHENOMENA OF DENTITION, AND ON THE SYMPTOMS WHICH ACCOMPANY THE DENTAL IRRUPTION.

The process of dentition was formerly considered as the almost exclusive origin of the greater number of the diseases of children. This is a serious mistake, one very extensively diffused, and especially adopted; it will be as difficult to rectify it as most of the popular medical prejudices, primarily sanctioned by the errors of physicians.

It is, then, necessary to study afresh the phenomena of dentition, in order to establish from observation of the patients what is their true influence on the development of diseases. This is what we shall attempt in this chapter. As we shall see, there is but a very small number of diseases which are really the result of the process of dental irruption.

I shall first describe the physiological phenomena of the dental irruption according to MM. Richerand and Bérard.

About towards the end of the seventh month the inferior middle incisor teeth pierce the tissue of the gums. Shortly afterwards the corresponding incisors of the upper jaw appear, then the *superior* lateral incisors, and lastly, those of the lower jaw. This order of irruption slightly differs from the order indicated by physiologists, who admit the irruption of the inferior lateral incisors before the appearance of the superior lateral. The above order is that of nature. I have very many times had the opportunity of observing it in the practice of M. Trousseau, who acquainted me with this disposition.

The first small molars, four in number, succeed the incisors, leaving between them and the incisors a space which at a later period the canines fill up, the irruption of which is generally more tedious and more difficult; the second small molars soon follow the canine; these small molars are larger than the corresponding teeth of second dentition. When towards the end of the second year these twenty teeth have appeared, the first dentition is accomplished; the life of the children is more assured; it was previously very uncertain, since the calculations

on the probability of human life prove that a third of the children who are born in a given period, die before having attained the age of twenty-three months. To these twenty teeth two new molars are added to each jaw when the child has arrived at the end of his fourth year. These last will finally form the first great molars; they differ from the preceding in that they should remain during the whole life, whereas the primitive or milk teeth fall at the seventh year, in the order according to which they appeared in the jaws, and are replaced by new, better formed teeth, larger (with the exception, however, that the small milk molars are always larger than those which replace them), and the fangs are longer and better developed. Towards the ninth year, two new large molars make their appearance beyond the first; the child has then twenty-eight teeth. Dentition is sometimes complete from the eighteenth to the thirtieth year, and sometimes even much later. The late, or wisdom teeth, to the number of two on each jaw, appear at the most distant part of the alveolar border.

The order which is observed in the successive irruption of the teeth is by no means so invariable as not to be frequently disarranged. The superior incisors are, in fact, very often observed to appear before the inferior incisors, and all the small molars present themselves before the canine, &c. As Richerand observes, with respect to dentition, like all the processes of the living economy, instability forms its principal character. An attentive examination will soon demonstrate with what irregularity these phenomena proceed, which, whether physiological or pathological, appear most subjected to certain calculable and determined periods.

This double row of teeth which follow each other, existed in the jaws of the fœtus. Each alveolus, at this period of life, enclosed two membranous follicles, one placed over the other. That which should form the primitive tooth first swells; a calcareous matter incrusts its surface, and forms the body of the tooth which thus invests the follicle by which the bony part is secreted, in such a manner that the development of the little bone being finished, the membranous vesicle in which the dental vessels and nerves ramify, is observed in the centre of its body, and adheres to the walls of its interior cavity. The tooth is then a calcareous substance secreted or rather excreted by the dental vesicle; vessels ramify in the walls of this vesicle, and prolong themselves into the osseous substance; this is at least what may be presumed from the intimate adhesion of the membrane to the bone. The primitive dental germs are attached to those from which the second dentition is to originate; a membranous prolongation unites them, and in order to be continued from the former to the latter, escapes by the small openings with which the alveolar border is pierced. It is by these small openings, of which Sabatier, Bichat, and Boyer make

no mention, that the secondary teeth issue, the germs of which are behind the primitive teeth. Fallopius was aware of this communication of the dental germs and the small holes, *foramina* (Soemmerring), which allowed the teeth of the second dentition to pass. It is then a mistake to attribute their discovery to these latter times.

It is not a difficult matter to state why the irruption of the dental germs is successive; why, in the seventh year, the primitive teeth become detatched, and are replaced by others which have remained so long imprisoned in the thickness of the alveolar ridges. The jaws, and consequently the alveolar arches, increase in dimension with age; the arch enlarges, so that the primitive teeth would not be sufficient to furnish it if nature did not replace them by other larger and more numerous teeth. The guinea pig, the little animal so often made use of in our experiments, that it may be very reasonably termed the victim of physiologists, presents this singularity: the teeth are not renewed, but push forward, and proceed from the alveolus in increased size, in proportion as friction destroys them, so that they are sufficient to furnish the alveolar border. The same thing is observed in rabbits.

It is with dentition as with all the other phenomena of the animal economy; it presents an innumerable multitude of varieties with regard to its period, duration, &c. Thus, the teeth have been observed to appear, for the third time, in people of very advanced age. Several cases are also related, but they are very rare, of children brought into the world with two incisor teeth in the upper jaw. Louis XIV was an instance of this. Bandelocque observes that the irruption of some of the teeth before birth is not always the consequence of an extraordinary development in the child, nor the presage of a better constitution, and proves it by several instances. Lastly, supernumerary teeth tend to establish the fact that the phenomena of dentition are subjected to the irregularities that most of the other phenomena of life are, whether physiological or pathological.*

The dental irruption is always modified by rachitis. When this alteration of nutrition makes its appearance before the sixth or seventh month, the period for the exit of the first teeth, their evolution is considerably retarded; when, on the contrary, this rachitis appears in the course of dentition, this process is arrested, and is not resumed until the rachitis has been cured. Nothing is better established than this fact, which serves daily for the diagnosis of rachitis before the occurrence of any other symptom.

Of the Symptoms of Dental Irruption.

It is not always an easy matter to determine the influence exercised

* Richerand et Bèrard, *Eléments de physiologie*. Paris, 1832. C. F. Burdach, *Traité de physiologie*. Paris, 1838; t. iii, p. 498.

by the process of dentition on the development of diseases of children at the breast. It is evident that it is not sufficient to prove the appearance of a disease in the course of a dental evolution, and to conclude from thence that it is the cause of this morbid manifestation; we must further appreciate the relation which unites these two phenomena together, and to discover if their existence is the result of a coincidence, or if, on the contrary, a relation of causality should be established between them.

Thus, all the diseases of children at the breast are developed at the time of dentition, since this process commences about the seventh month after birth, and terminates at the end of the second year. And are we then to say that all these diseases are the result of the dental evolution? Assuredly not; but there are a certain number of them which only appear at the time of the irruption of a tooth, and which reappear every time on the return of a similar occasion. These last may be regarded as truly symptomatic of dentition, and numerous facts appear to establish the reality of this coincidence.

The pneumonia which is developed in a young child about to cut a tooth has no relation with this phenomenon, since it is not reproduced each time that a fresh tooth is ready to pierce. Diarrhœa, convulsions, inflammations of the mouth, on the contrary, which, amongst some children, are observed each time that the inflammation of the gums announces the dental irritation, are intimately allied to this physiological phenomenon.

The symptoms of dentition are *local* and *general*. The first are those which are developed in the mouth as stomatitis, apthæ, membranous productions, &c. The general symptoms are certain diseases of the skin, the intestine, and the brain. These are also termed *sympathetic symptoms*.

At the time of dentition, the gums are always red and swollen; but in some children this swelling is very considerable and accompanied by very acute pain. The examination of the interior of the mouth is sufficient to appreciate the redness and swelling of the mucous membrane; the pain manifests itself by the cries of the little patient who is constantly weeping, and in some measure by the attack. There are no other alterations than those of the mouth which can explain these cries. In these cases, the salivation is very considerable, the saliva running out of the mouth in abundance. Sometimes the children keep the mouth open, the lips forcibly separated, and they incessantly apply their hands to their gums, as if they would indicate the seat of their suffering. They labour under fever which is very irregular; it is either continued or intermittent; their sleep is much agitated, and often interrupted. Nothing will calm them, not even the nurse's breast, which they sometimes refuse, or pettishly leave it after having seized it.

When the stomatitis, consequent upon the dental irritation, is more considerable, apthæ are observed on the buccal mucous membrane, and on the lips ulcerations which are covered with membranous productions. These alterations do not differ from those described under the head of diseases of the mouth. The same treatment is suitable in these various circumstances.

When the children are observed in the position we have just described, the mouth should be washed with an emollient, mucilaginous liquid. The mucous membrane should be frequently touched by a piece of cotton wetted with a decoction of the root of marshmallow or with that of linseed. Neither poppy nor opium should enter into any of these preparations.

A piece of the root of marshmallow, or of that of liquorice, may be given to the children to bite. An emollient liquid after a little time escapes, which may calm the inflammation of the gums. Moreover, pressure on these parts favours the exit of the tooth, and slightly lessens the pain which the patients experience.

It is much better to make use of these substances which become soft on being moistened, as dry figs, a crust of bread, &c., than to recommend the use of ivory, glass, or coral. These hard bodies may, on the contrary, irritate the gums, probably harden their tissue, and rather retard than favour the irruption of the teeth.

If the fever is very high, and accompanied by congestion towards the head, irritant pediluvia, with mustard, or soap and water, sinapisms to the legs, and leeches to the ears, are the most suitable remedies to be employed.

Lastly, there are some cases in which the gum is so red and so swollen at the situation where the tooth is ready to pierce, that it is thought the tension of the parts might be remedied by a slight surgical operation. Lancing the gums has been recommended; this operation is practised with a small instrument made on purpose, or with a bistoury. It consists in a crucial incision, or in an elliptical incision which entirely removes a small slice of the gum from the place of exit of the tooth. Of these two, it is better to employ the last, for the other is often useless; the edges of the crucial incision unite again, and if cicatrization takes place, the irruption of the tooth is retarded, a result quite opposite to that we wished to obtain.

This operation has been very differently judged of by medical men; it is proscribed by some and adopted by others. It is seldom practised in France; but, on the contrary, it is in very common use in England.

It neither deserves the blame which some throw upon it, nor the praises which some bestow on it. It is a useful operation which may sometimes render great service. It remedies the extreme tension of the gums, occassions a slight loss of blood which is salutary; and lastly, leads to the irruption of the tooth.

On the General or Sympathetic Symptoms of Dentition.

These symptoms comprise convulsions, certain diseases of the skin, which are termed in the vernacular, *feux de dents*, slight inflammation of the conjunctiva, and inflammation of the intestine.

The convulsions sympathetic of dentition do not at all differ from the convulsions which are observed in the other periods of infancy; they pass off quite as rapidly, and like them are in no way dependent on an appreciable organic affection of the brain. They must be related to the dentition when they manifest themselves every time in the course of the process which precedes the irruption of one of the teeth. In fact, we observe children which never have convulsions, except under these circumstances.

If the children die, which has been more than once observed, no change is discovered in the brain; if it presents traces of an inflammation, the convulsions ought then to be considered as symptomatic convulsions. These convulsions should be treated in the manner we have pointed out at the end of the chapter devoted to essential convulsions.

Eczematous, impetiginous, or simple erethematous eruptions are often observed in the bodies of young children who are teething. These eruptions present themselves on the body, or on the limbs, and on the head; they have been designated *feux de dents*. It has not been demonstrated that between this morbid manifestation and dentition there exists anything more than a coincidence, and by no means in relation, of causality. In fact, these eruptions do not always appear at the period of the inflammation of the gums, and do not disappear with it; neither are they reproduced at the time of each irruption of the teeth. It is then difficult to establish a positive correlation between them and the dental evolution.

The mucous membranes are especially the seat of the sympathetic symptoms of dentition. The conjunctiva is rather frequently inflamed at the period of the eruption of the canines and of the molars; but the inflammation is very soon dissipated under the influence of emollient remedies. When it assumes a more serious character, it must be treated by antiphlogistics and topical astringents.

The influence of the dental irruption upon the diseases of the alimentary canal is completely established; it is demonstrated by numerous observations. There are children which constantly experience diarrhœa at the period of the eruption of each of their teeth. The relation between these two phenomena rests, then, on the firmest foundation.

The irritation of the bowels, which is the result of teething, is often very slight; it only lasts a few days, and ceases in order to reappear at a later period on a similar occcasion. It does not appear to be connected with an alteration of the intestine, for it is not in

general accompanied by fever; its termination is nearly always favourable. In some circumstances, however, it presents all the characters of acute entero-colitis, and depends upon inflammation of the mucous membrane.

The diarrhœa of dentition is, then, most frequently idiopathic; it is perhaps the result of a simple acceleration of the peristaltic movement of the intestines, occasioned by the general nervous state of the children. It is, probably, a nervous diarrhœa. In fact, if fear, cold, or some acute moral emotion can provoke diarrhœa, and this is incontestable, it is not impossible that the pain of dentition, and the nervous agitation which is the consequence of it, may determine the same result.

Whatever may be the nature of this diarrhœa, it must be treated by the appropriate means. First, it very much weakens the children; afterwards, it may persist in a permanent manner, and then it is evident that it is symptomatic of an intestinal alteration. Further in the chapter devoted to the study of diarrhœa, will be found the series of means by the aid of which we may remedy this disease.

APHORISMS.

220. The first teeth should appear from the lower jaw, between the sixth and eighth month.

221. The first teeth appear very late and very slowly in rickety children.

222. The median inferior incisors, then the median superior, then the superior lateral, and after the inferior lateral, appear successively by groups in their respective alveoli.

223. After the irruption of the incisor teeth, that of the first small molar teeth commences.

224. The canine teeth always appear after the first molar teeth.

225. After the irruption of the canine teeth, the process commences which should prepare the evolution of four new molars which complete the set of teeth of childhood.

226. A short period of arrest, a veritable period of repose, always exists between the appearance of each group of the teeth of early childhood.

227. The teeth of early childhood are twenty in number, and are called *caducous*, in consequence of their premature decay between the seventh and eighth year.

228. The caducous teeth are replaced, on their decay, by new permanent teeth.

229. A third dentition is observed, but it is an exceedingly rare phenomenon.

230. Good or bad teeth is an hereditary circumstance in families.

231. Short teeth, of a yellowish white colour, are the strongest, the most lasting, and indicate a good constitution.

232. White and long teeth are soft and readily decay.

233. Teeth with a bluish tint indicate a feeble constitution, and are frequently met with amongst phthisical subjects.

234. The irruption of the teeth very often engenders local symptoms of simple, ulcerous, or apthous stomatitis, and general sympathetic phenomena, developed on the skin, mucous membrane, and nervous system.

235. The ulcerous stomatitis caused by dentition should be carefully treated, in order to avoid the formation of glandular enlargements of the neck.

236. The diarrhœa of dentition should be arrested as soon as it becomes very abundant.

237. It is in the highest degree unreasonable to acquiesce in the popular adage, which, everywhere and always, accords immunity to the accidents of the first dentition.

CHAPTER IV.

ON PHARYNGITIS.

Inflammation of the pharynx is a very rare circumstance in infants and children at the breast. There are scarcely any examples of it in the various treatises on medicine. I have discovered a very curious one which appears worthy of mention here. It relates to the development of an abscess in the posterior wall of the pharynx, and it has been published by M. Besserer. This is the substance of it: the case will be afterwards given at full length.

A child, four months old, was seized with fever, hoarse and frequent cough, obstruction to the respiration, and difficulty of deglutition. At the end of forty-eight hours the child was unable to drink, the anxiety was considerable, and the finger introduced into the back of the throat discovered a tumour projecting in front of the vertebral column. On the tenth day the tumour had acquired a considerable volume, but it could not be well examined, as every attempt at this kind brought on attacks of suffocation. It was thought to be croup; and the child died.

There was nothing wrong in the larynx, but there was, in front of the vertebral column, behind the posterior wall of the pharynx, an abscess as large as a hen's egg, enclosing half a cupful of pus, which a small incision would have easily liberated.

Case. Abscess of the posterior wall of the pharynx, in a child four months old. A child four months old, born of scrofulous parents, presented 21st November, 1840, the following symptoms: moderate fever; hot, dry skin; easy, moist, unfrequent

cough; mucous râles, particularly in the larynx and trachea. The buccal cavity and the back of the throat were filled with filamentous and viscous mucosities. The posterior wall of the throat appeared to be covered with a false membrane. The base of the tongue was enlarged and covered with a white layer. The respiration was accelerated, deglutition manifestly difficult, the child took the breast but rarely. It was thought that a diphtheritis with laryngeal and tracheal catarrh existed, and an emetic was prescribed. On the 23rd, the symptoms, especially those which referred to the respiratory fuuctions, were more serious. Respiration was very difficult, sometimes with rather long intermissions, especially on dorsal decubitus; the cough was hoarse and frequent. The râles are very loud, and there is much mucosity in the back of the throat. The finger introduced into the mouth, discovers the posterior wall of the pharynx projecting and swollen. The child is very much agitated and in a state of great anxiety; it would not take the breast, and allowed the small quantity of milk given it to drink to run from the mouth. A fresh emetic was administered and three leeches applied to the neck. After vomiting had taken place there was a little improvement; calomel was then given in the dose of half a grain every two hours, and the application of a blister prescribed. The symptoms remained stationary until the 1st of December; only the child grew weaker. They suddenly and violently returned in the night of the first to the second. A certain sound was, moreover, detected which appeared to be that of a membrane ruptured by the effort, after having for a long time obstructed respiration. Every attempt to examine the larynx brought on attacks of suffocation. M. Besserer, believing it to be a case of croup, prescribed the sulphate of copper. In the evening the child was found with the head strongly thrown back, the face pale, covered with a cold sweat, and in a state of extreme agony. The finger introduced into the back of the throat discovered a firm tumour which did not manifestly appear to narrow it. This manœuvre rendered the respiration more easy, as did also pressure on the sides of the larynx, carrying this organ forwards. Bleedings, emetics, &c., were followed by a slight amelioration; but the next day the attacks became more violent, and the child died in the night.

On the examination of the neck after death, it was discovered that the larynx, the epiglottis, and the trachea, were white, exsanguine, and covered by a viscid mucus. The posterior wall of the pharynx which was not at all covered by false membrane, as it was believed to have been observed to be during life, was white, swollen, and very thick; it formed the anterior wall of an abscess as large as a hen's egg. This abscess formed exclusively by the cellular tissue, rested on the bodies of the first, second, third, and fourth cervical vertebræ, and contained half a cupful of thick, flocculent, greenish yellow pus. The vertebræ did not present any traces of disease.—(*Gein. und Westf. Correspondenzbl.* No. 22, 1844.)

[Abscess between the spine and the pharynx is occasionally observed, in which case surgical interference is as effectual as it appears to be essential from the symptoms, and not alone from the fact of certain fatal results from mechanical pressure on, and interference with, vital organs, but also from the situation of the abscess being particularly favourable to extensive diffusion. Dr. O'Ferrall has seen, in one case, a spontaneous opening occur: the abscess was high up, and matter passed through the nose. The abscess should be opened with a straight bistoury, with the cutting part short, as the density of the covering renders the plunges of a trochar unsafe.—P.H.B.]

Cynanche Parotidea.

[Cynanche parotidea, or mumps, consists of inflammation of the parotid, sublingual, and submaxillary glands, occasionally associated with that of the tonsils. It is more fequently met with as an epidemic, although it occasionally occurs as a sporadic affection. It usually commences with the ordinary symptoms of slight fever or catarrh, which are followed, in from twelve to twenty-four hours, by pain and stiffness of the neck and the lower part of the jaw. Swelling is then observed about the angle of the jaw; sometimes confined to one side, sometimes on both sides at once; but it is most commonly observed first on one side and then on the other. In consequence of this swelling the motion of the lower jaw, for the purposes of speaking and mastication, is much impeded, and attended with considerable suffering. The swelling is very tense, but the skin generally preserves its natural colour, except in some cases, in which the glands on both sides, being enlarged and pressing much upon the veins, the return of blood from the head is impeded, and the face assumes a flushed appearance. If the case be a severe one, the child is feverish, and may be delirious; but the inflammatory condition almost always terminates in resolution after a few days. The disease reaches its height in about three or four days, and then begins to decline; its whole duration may be averaged at eight or ten days. Evanson and Maunsell *(On Diseases of Children)* state, that the swelling of mumps, at times but very rarely, will proceed to suppuration, and may cause immediate death, by discharging its contents into the larynx, if it burst internally, or lead to great deformity when it opens externally. West believes that suppuration is oftener met with in infants and young children than those who are approaching the period of puberty; but that, on the other hand, metastatis of the disease from the parotid to the mamma, the testicle, or the brain, of all of which instances are recorded by different writers, appears to be rare in proportion to the tender age of the patient. The treatment of this disease is very simple; mild antiphlogistic medicines, and the application of warmth, being all that is required, local depletion being neither necessary nor useful.

M. Rilliet has published a very interesting account (*Gazette Medicale*, 1850) of an epidemic visitation of mumps, which prevailed there from March, 1848, to May, 1849. In the majority of cases there were no premonitory symptoms, those of a local character being the first intimation of illness the patient received. The tumefaction of the parotidean and mastoidean regions continued increasing from four to six days, and, after remaining stationary, then rapidly diminished, so as to have disappeared by from the seventh to the tenth day, the submaxillary gland continuing hard and swollen, in several cases, long after the resolution of the parotidean tumour. The frequent cases were those in which the tumefaction was of medium size only; but in some it was enormous, extending almost to the external extremity of the clavicle. In such, and in subjects predisposed to neuralgia, the pain was severe and even violent, but in the other cases, moderate—it being usually spontaneous, but also augmented by pressure and every movement of the jaw, which indeed was sometimes as immoveable as in tetanus. In some cases, when the mouth could be sufficiently opened to allow the tongue to pass, the patients were unable to protrude it. In no case did Rilliet, or any of his colleagues, witness salivation, nor, when examination of the mouth and fauces was practicable, could any exanthema be observed. The swelling was usually double, but rarely so at first, commencing usually on the left side, and then proceeding, in a period varying from twelve hours to three or four days, to the opposite side, one gland being almost always more swollen than the other.

The accompanying constitutional irritation was not prolonged beyond forty-eight hours, save in very bad cases. A feeling of great lassitude and debility accom-

panied or followed the appearance of the swelling, several patients not recovering their ordinary strength for two or three weeks. The cure was always more prompt and complete in children. The duration of the disease, in slight cases and in children, was but four or five days; but in other cases, usually eight or ten; then six or seven, and lastly, seven to eight days. In some it continued even to the fifteenth day. No example of the termination of the disease in *suppuration* occurred. The disease rarely attacked children under two years of age, and no example occurred under one. The maximum number occurred between five and fifteen. The two sexes were affected nearly alike.

Rilliet believes the disease to be analogous in its nature to *eruptive fever, and to be contagious.* The period of incubation was most frequently found to be from twenty to twenty-two days, and then from fourteen to eighteen days. Still, in one of the best marked cases, it did not exceed eight days. It prevailed equally in warm and cold weather. The only complication frequently observed was *orchitis*, the youngest person attacked being fourteen, but no case of *metastasis*, properly so called, was noticed; but one case of tumefaction of the labium was met with.—P.H.B.]

Cynanche Tonsillaris.

[The term cynanche tonsillaris or quinsy is applied to inflammation of one or both tonsils. It is accompanied by swelling of these parts which interferes with swallowing and breathing; on the inspection of the throat, more or less of inflammatory redness and swelling are observed on one or both of the tonsils. Sometimes both of them are affected at once; very often one only is first attacked, and the swelling commences in the other as it ceases in the first. The uvula is enlarged, elongated, and of a bright red colour. Opaque whitish spots are observed on the inflamed tonsil at an early stage of the disease; these are merely exudations or the discharged contents of the mucous crypts, and must not be mistaken for specks of ulceration. Swallowing is difficult and painful, and the pain is almost solely felt during the act of deglutition; occasionally the inflammation extends along the Eustachian tube, giving rise to tinnitus aurium and pain in the ears, or this may be simply caused by closure of its extremity in consequence of the swollen state of the parts about it. When in severe cases pain shoots from the throat to the ear along the course of the Eustachian tube, suppuration is to be feared. The voice becomes thick, guttural, and inarticulate from the blocking up of the throat and the obstruction to the free play of the velum palati. Cynanche tonsillaris is usually attended with considerable febrile reaction, much more indeed than might be expected, considering the limited extent of the local inflammation, but it is not followed by debity.

The inflammation usually terminates by resolution, but when it is violent, long continued, or occurs in persons who have a peculiar disposition to these attacks, it frequently leads to suppuration.

With regard to the treatment, Watson (*Lectures on the Principles and Practice of Physic;* vol. i, p. 786) believes that the disease may be cut short in its very outset by an emetic. When the inflammation is established the little patients should be kept in doors, warm applications and stimulating embrocations applied to the exterior of the throat; if the patient is old enough, gargles of warm water or warm milk and water should be used, and in a more advanced stage one containing a weak solution of chlorine. In the more chronic states, solutions of the nitrate of silver gallic acid of the tincture of iodine should be applied. Professor Hess, of Copenhagen, uses compression by means of the index finger applied to the indurated tonsil with success, repeated three or four times a day;

when the gland becomes softer and absorption commences, stimulating gargles may be used.

In ulcerated sore throat with much exudation (diphtheritis), Mr. Blyth (*Medical Times and Gazette;* April, 1853) recommends the internal administration of *chlorine* conjoined with quinine. He puts into a pint bottle eight grains of chlorate of potash, and ℥ j of hydrochloric acid; a violent action ensues, during which time the bottle is corked. ℥ j of water is then poured in and the bottle is well shaken until the chlorine is partly absorbed; another ounce of water is then poured in, and so on until the bottle is filled. A weak solution of chlorine is thus prepared, of which, to a child, two teaspoonfuls, with quarter of a grain of quinine, may be given every two or three hours. Dr. Hamilton Roe (*Lancet;* March) had previously recommended a similar preparation of chlorine in scarlatina.

When an abscess forms in the tonsil, great care should be taken in puncturing it, for Watson relates the case of a boy in whom very considerable and troublesome hæmorrhage followed this operation.

M. Robert (*Bull. Gen. de Therapeutique;* May, 1843) treats of the results produced by chronic enlargement of the tonsils in childhood. The enlargement is never confined to one side, and occasionally it becomes very considerable; in which case it not merely affects the voice, but likewise, by its pressure on the Eustachian tubes, greatly impairs the sense of hearing. It further interferes with the passage of air by forcing up the velum, and hence children thus affected sleep with their mouth open. It also gives rise to a constant dry troublesome cough, imparts a nasal tone to the voice, and, owing to air never passing through the nares, the nose does not become properly developed, but remains narrower, and the anterior part of the face thin. Its most serious result, however, is that flattening of the chest, to which attention was first called by Dupuytren. M. Robert thinks that it is produced by the enlarged tonsil preventing the entrance of air, at each inspiration, in sufficient quantity to fill the vacuum in the chest, or to cause a pressure from within the lungs equivalent to the atmospheric pressure without. This deformity of the chest cannot exist without giving rise to dyspnœa, palpitation, and the various results of interrupted respiration and circulation; hence children in whom it exists are usually pale, thin, and weak.

The symptoms of enlargement of the tonsils usually make their appearance between the sixth month and the second year, and it is probable that the hypertrophy is due to the irritation of dentition. In further proof of this, M. Robert mentions that he has seen evolution of the dens sapientiæ in the adult attended with inflammation and hypertrophy of the tonsils.

When once enlarged the hypertrophied tonsils never diminish in size; M. Robert therefore advises their excision. He suggests, also, various modes of diminishing the deformity of the chest, and describes different gymnastic exercises appropriate for this purpose.—P.H.B.]

CHAPTER V.

ON STOMATITIS.

The diseases of the mouth in children are numerous. Their frequency may be explained, first, on account of the continual inflammation of the buccal mucous membrane, brought on by the extreme irritation, precursory to the dental irruption, and secondly, by the sympathy or

by the intimate relations which exist between this and the intestinal mucous membrane so often affected in young subjects.

We shall describe in order:

1st. Simple stomatitis.
2nd. Ulcerous stomatitis.
3rd. Mercurial stomatitis
4th. Apthæ.
5th. Gangrenous apthæ.
6th. Gangrene of the mouth.
7th. Thrush.

1st. Simple Stomatitis.

Simple stomatitis is described by many authors under the name of erythematous stomatitis. What they would thus term consists in inflammation of the buccal mucous membrane.

Stomatitis generally occupies the whole of the mucous membrane of the mouth. This membrane presents a redness which is sometimes diffuse, sometimes in spots, or disposed in patches. Its tissue is the seat of a more or less considerable swelling.

The mouth is hot, rarely dry, often painful, as far as we can judge in children at the breast, by the cries which they utter on seizing the breast, or in taking the food which is given them. In these children the salivation is considerable; a colourless, glairy, and stringy liquid flows from the mouth, the quantity of which is more abundant than natural.

In children, as is well known, the saliva flows involuntarily from the mouth until the age of about two years, that is to say, until there are a sufficient number of teeth to retain this liquid.

Simple stomatitis is not attended by general symptoms; it is not accompanied by febrile reaction, at least if it is not of considerable intensity. That which is manifested at the time of the dental irruption, often accompanied in some children with severe pain, sometimes occasions a rather high fever.

Laborious dentition is the most frequent cause of the simple stomatitis which is observed in children at the breast. It is also met with in the course of certain eruptive fevers, measles, scarlet fever, or smallpox; it is often the result of the irritation of the mucous membranes of the mouth by various local causes, such as the application of irritant or poisonous substances, certain operations practised on the neighbourhood of this cavity, &c.

This disease is easy of cure, and does not in general lead to consequences fatal to the children; it sometimes changes into ulcerous stomatitis. This is the only termination to be feared, and it is, moreover, easy to prevent this by suitable treatment.

Mucilaginous lotions should be applied to the mouth of the children; they should have a piece of liquorish root to press between the alveolar arches, and the interior of the mouth should be washed with an astringent lotion. This means is absolutely necessary when the inflammation becomes very considerable.

Honey	3 parts.
Borax	1 part.

Mix, and apply with a camel's hair pencil.

Or the following may be prescribed:

Honey	℥ j.
Sulphate of alumina	30 grains.
Distilled water	℥ ss.

Mix, and apply with a camel's hair pencil.

If the disease is accompanied by a very considerable general reaction, which is very rare, we must not hesitate to place some few leeches under the jaws.

The stomatitis of eruptive fevers should be treated by the same means. It is especially necessary that the state of the buccal mucous membrane should be carefully examined, to watch the progress of the disease, and to prevent its transformation into ulcerous or diphtheritic stomatitis.

2ND. ULCEROUS STOMATITIS.

Ulcerous stomatitis is always preceded by the simple stomatitis we have just described.

The buccal mucous membrane is swollen, its heat is considerable, and it presents a redness usually diffuse, and sometimes more apparent in some points of its extent. Moreover, there are observed on its surface, on the gums, on the internal surface of cheeks, near the commissure of the lips, on this commissure and on the lips themselves, more or less numerous ulcerations the form of which is sufficiently varied.

These ulcerations are sometimes roundish, sometimes longitudinal. Their edges are red, bluish, and liable to bleed on the slightest touch. Their base is ash coloured, and is formed sometimes by thick mucus, beneath which is observed the ulcerated mucous membrane, sometimes by a pseudo-membrane difficult to raise, adherent to the mucous membrane, which is observed in great part destroyed. These small ulcers sometimes rest upon the slightly hardened subjacent tissue, but this circumstance is rare.

In the first stage specks of a yellowish white colour are observed, which form on the mucous membrane a projection much less marked than those of apthæ. When these vesicles burst, a small plastic concretion escapes, and then the ulceration of which we have spoken

remains. It slightly increases each day, and presents the characters indicated in the preceding paragraph.

The ulcerations of the mouth, situated on the internal surface of the cheeks and on the tongue, are in general rounded; those of the gums are more long than broad, and placed transversely. They sometimes destroy the tissue of the gum, and are the cause of the loosening of the teeth. Those of the lips and of their commissure are longitudinal, and enlarge with great facility. The attempt at cicatrization is constantly interrupted by the continual movement of these parts.

The disease commences, observes M. Taupin, who has published an excellent memoir on this variety of stomatitis, in the gums, which are enlarged, puffy, red, and full of blood. They then become covered by a greyish soft layer. From the gums the acute inflammation invades the posterior surface of the lips and the internal surface of the cheeks, which are here and there covered by a similar exudation to that which we have described, and beneath which the mucous membrane is ulcerated.

The ulcerations are roundish in the mouth and longitudinal upon the gums and on the lips. If the disease is prolonged, the submucous tissue becomes hardened at the seat of the ulcerations, and remains in this state several days after their cicatrization.

The submaxillary glands are swollen; they become hard and painful if the inflammation is intense. This is the origin of scrofulous tumours of the neck in certain children predisposed by their temperament to tubercular affections.

Ulcerous stomatitis, like simple stomatitis, is accompanied by a rather abundant salivation; the breath is fœtid; the children sometimes appear to suffer much. Some keep the mouth open and the lips separated, in consequence of a strong contraction of the muscles of these parts. They are continually putting their fingers in their mouth, and appear to wish to relieve themselves of something which distresses them and makes them suffer.

This gives to the physiognomy of the children a particular aspect, whence results an excellent external symptom of their disease. The strong separation of the lips sufficiently indicate the seat of the pain, which the direction of the hand, continually carried into the mouth, further specifies. Such signs suffice to fix the attention of the physician, and to inform him of the disease for which he is consulted.

Stomatitis is usually preceded and always followed by a more or less decided derangement of the bowels, which further increases the importance of the disease. Then are observed the symptoms of entero-colitis, such as will be pointed out further on. It is useless to describe them here, but they must be mentioned in order to draw attention to this subject. Most of the children, attacked by stomatitis, are of feeble

constitution, or deteriorated by preceding diseases, and especially by enteritis. This is again a circumstance which must be attended to in the treatment.

Ulcerous stomatitis is soon cured when it is properly treated, and when it is not developed in too feeble a child, or in one labouring under a serious disease of the digestive tube. In this case it may continue a considerable time. It lasts from eight days to one or two months.

The causes of stomatitis are rather difficult to discover; however, we may reasonably state, that teething exercises a great influence over its appearance. It is sometimes the result of a mechanical cause, of caries of a tooth, of necrosis of the inferior maxilla, &c. Diseases of the intestine, feebleness of the constitution, predispose to it in a remarkable manner. It is more frequently developed in boys than in girls, and in children badly looked after, imperfectly nourished, wretchedly lodged, belonging to the poorer classes living in damp, unwholesome, and badly ventilated places. It is observed in all seasons. It is sporadic and contagious, as M. Taupin has demonstrated it to be, in the work we have cited. The contagion, then, takes place by direct transmission, by means of a glass, a spoon, or of any other body the children carry to the mouth.

The treatment of this disease rests on many important indications. Tone should firstly be given to the constitution of the infants by means of tonic medicines, and the existing diseases should be treated by suitable remedies.

We then proceed to the local treatment of the disease. If by chance it originates from the irritation of a decayed tooth, this should be extracted. Putting aside this case, the means usually put in use against stomatitis are the following:

At the commencement, emollient gargles, emollient injections, in those young children who cannot gargle, are very useful. When the inflammation extends, it should be treated by topical remedies.

In the first rank may be placed the cauterization of the ulcerated parts with the nitrate of silver or hydrochloric acid, and in the intervals, the use of an application of equal parts of honey and borax. This means, in daily use by M. Trousseau at the Necker Hospital, has proved successful in many children.

M. Bonneau, physician at the hospital for children, recommends the employment of dry chloride of lime, and he regards it as a very useful remedy. The chloride of lime should be very dry and perfectly pulverized. The moistened finger is put into this powder, and thus charged, it is rubbed on the diseased parts. If necessary, this operation should be repeated twice a day. It determines the detachment of the concretions which cover the ulcers, modifies their surface, and facilitates their cicatrization.

Immediately after using this application, a mucilaginous liquid should be injected into the mouth, the head of the patients being tilted forwards to prevent them swallowing this solution of chlorine.

I prefer employing the chloride of lime, under the form of an application prepared as follows:

Honey	3 vj.
Chloride of lime	45 grains.

To be applied by means of a camel's hair pencil.

If the inflammation of the buccal mucous membrane is very acute, if the glands of the neck are enlarged, it may be proper to assist the topical medication by the application of leeches below the jaw. Their number should be proportioned to the age of the subjects. I have observed great benefit from their employment on a like occasion.

3rd. Mercurial Stomatitis.

It is well known that children are more refractory to the action of mercury on the gums than adults. This, in my opinion, is the reason why the employment of calomel as a purgative in children has been adopted in England. The younger the children are, the less the mucous membrane of the mouth yields to the specific influence of mercurials.

Thus, we may treat a young child by mercury in large doses, without the fear of seeing stomatitis, with an abundant salivation, ensue. I have even several times had occasion to administer this medicine to infants, without any bad symptom resulting.

These results of ordinary experience are, however, contradicted by a case, quite an exceptional one I admit, but which must not be kept in the back ground, and which it is proper that every one should be aware of. The case has been already published,* but I shall here repeat it.

A fine boy, two years old, strong and well developed, presented in the fold of the groin some of those excoriations so frequent in children who are too fat. His mother, thinking to powder this wound with lycopodium, applied some powder of corrosive sublimate, which her husband, a fabricator of chemical preparations, had left at home.

An eschar soon formed: it covered half of the scrotum, the fold of the groin and the skin of the superior and internal part of the thigh, to an extent of 4 inches by 3.2 inches.

The agony was intense, and nothing could calm it.

Several days passed, and towards the fourth day, when the eschar seemed ready to detach itself, salivation supervened, attended by swelling, ulceration, and mortification of the gums, tbe loosening and removal of the milk teeth, necrosis of the bones; and lastly, death in the midst of the most decided mercurial cachexia.

[In a case which came under my notice, a boy aged six, the administration of

* *Gazette des hôpitaux. Année* 1843.

calomel was followed by salivation, ulceration of the gums, and ultimate exposure of the body of the inferior maxillary bone of the left side, about one inch of the entire thickness of which separated; he rapidly recovered.—P.H.B.]

On Aphthæ.

Like Willan and Bateman, we apply the name of aphthæ to the vesicular eruption of a roundish shape which takes place in the interior of the mouth. We put aside the simple erythema of the mucous membrane of the mouth, the ulcerous stomatitis of which we have just spoken, thrush, gangrene of the mouth, diseases entirely different and easily distinguished, as will be seen further on.

Aphthæ is characterized by small whitish vesicles formed on the mucous membrane of the mouth, at the places where the epithelium is most apparent. Thus they are observed on the internal surface of the lips and the cheeks, on the gums, tongue, soft palate, and sometimes in the pharynx. They are not accompanied by the inflammation of the buccal mucous membrane. It is said that they may be developed in the intestinal canal, but the fact is far from being demonstrated. An ulcerous enteritis, with its ordinary characters, is sometimes there observed; but I do not think that the nature of this alteration can be allied to that of the affection which exists in the mouth.

Shortly after the appearance of the vesicle, an induration, scarcely perceptible, forms at its base. It bursts and allows the liquid it encloses to escape. It is then replaced by a small greyish ulceration, with a red border, slightly projecting, which remains stationary for a time, and cicatrizes, or else enlarges, and then assumes a state favourable for cicatrization.

These ulcers are not, in general, accompanied by inflammation of the mucous membrane. There is no concomitant stomatitis. They last from four to five days, and disappear without leaving any traces. Their number is variable. It is thought that, according to their quantity, two varieties of aphthæ should be described; and rightly so. In fact, in some circumstances, the eruption is discrete, in others it is confluent. These two kinds differ much as regards the prognosis.

Discrete aphthæ are thus called because they are few in number. They are developed both amongst children and amongst adults. They are not observed amongst children at the breast until after the commencement of dentition.

It is a slight and rather common disease. It is generally accompanied by a little fever and slight irritation of the bowels. It is developed in preference amongst children whose constitution is feeble and tubercular.

The ulcerations last from five to seven days, and disappear. They cause slight pain. The children incessantly carry the hands to the mouth, and cry to attract the attention to this part.

Confluent aphthæ are more rare, and are not observed amongst young

children. This disease is more unfavourable. It is nearly always allied to a serious general condition, to pulmonary phthisis, or to the puerperal influence at the time of the epidemics which attack nurses. Its progress is much more slow, and its cure more difficult.

The treatment of aphthæ, especially, consists in the employment of topical means.

In young children, the employment of gargles is impossible. The operation requires an intelligence which the subjects do not possess. The diseased parts should, then, be touched with a pledget of lint or cotton dipped in a decoction of marshmallow, in barley water, or in undiluted milk. A small quantity of the syrup of poppies may be added, or some drops of the tincture of opium, so as to calm the child if it appears to experience great pain in the mouth.

We may employ with more advantage, and in the same manner, a mixture of equal parts of honey and barley water; a mixture of equal parts of borax and honey; the application containing alum, the decoction of rhatany root, of oak bark, with the syrup of lemon or the syrup of currants.

If the aphthæ resist these means, they should be cauterized with a crayon of alum or of nitrate of silver.

When by observation of the patient, we arrive at the conclusion that the disease is the result of a general morbid condition, natural weakness, the scorbutic state, a tendency to inflammation of the bowels, &c., it becomes necessary to add to the use of topical applications the influence of different therapeutic agents suitable to remedy these diseases.

The subcarbonate of iron, the syrup of bark, are very advantageous to weak children. The antiscorbutic syrup may be given to the scrofulous, and to those which present some symptoms of scorbutus.

If the subjects are predisposed to diseases of the bowels, and if the disease consists in a transient gastric derangement, the syrup of ipecacuanha may be prescribed in a dose proportioned to the age of the child; or slight purgatives, castor oil, senna draught, or still better, calomel in powder or pill. Great reserve should be used in the employment of these means; if the child is attacked by a chronic entero-colitis, the means recommended against this disease further on, should be made use of.

5th. On Gangrenous Aphthæ.

Those who have had frequent opportunities of observing the aphthous disease of children, know that in some cases one or more of the ulcerations suddenly assume a serious and unexpected aspect. They extend, invade the neighbouring and deep tissues, and occasion a loss of substance which is sometimes considerable; they form a circumscribed eschar, which might be really termed gangrene of the mouth, if its extent exceeded these limits.

There is reason, therefore, in referring gangrenous aphthæ to gangrene of the mouth, of which they are perhaps the first stage. The nature of the disease is evidently the same; but the progress of the symptoms, and the extent of the lesions, distinguish these two diseases. It is henceforth impossible to confound them.

As Billard remarks, aphthæ often pass to the gangrenous state; their edges shrivel, assume an ashy, ragged, softened appearance; a brown eschar forms in their centre, which soon detaches itself, leaving a reddish and granulated surface exposed. In place of the eschar on the centre of the ulcer, a substance of a very soft consistence is sometimes formed: it is of a brownish colour, and possesses a very evident gangrenous odour. The surrounding parts become swollen, assume a violet appearance, are soft and easily depressed. During this period, the mouth of the child is always half open, whence a fluid and streaky saliva dribbles; the face is pale, the patient listless, depressed, gently dies without having presented any febrile reaction or cerebral excitement.

With these symptoms, vomitings, diarrhœa, combined with hiccough, or frequent regurgitations, are sometimes observed. The pulse is always of extreme weakness; the skin is remarkable for its pallor and insensibility.

The gangrenous transformation of aphthæ is rare; it is a very serious occurrence, one which may be followed by the most serious consequences and determine death, in consequence of the state of weakness in which the children are observed when this complication manifests itself.

The progress of the gangrene of the aphthæ should be arrested from its very commencement. This can only be done by means of an energetic treatment. Instead of losing time in the employment of palliative remedies, caustics should be applied on the diseased parts, so as to modify their vitality, and to place them in the conditions favourable to cicatrization.

Gangrenous aphthæ should be cauterized with a brush moistened with hydrochloric acid, or with a stick of nitrate of silver. Cauterization by the acid nitrate of mercury must not be employed in this case, in consequence of the salivation which might result.

The first cauterization should be deep; and it should be renewed as often as the state of parts requires it.

6th. On Gangrene of the Mouth.

This disease, of which we find little mention in the old authors, does not appear to have attracted the attention of medical men until about three centuries ago. Since this epoch, it has been the subject of many interesting monographs, for they are, generally speaking, well written and leave little to be desired.

Gangrene of the mouth, also described under the term of gangrenous

stomatitis, has received the most opposite names by those who have studied it. The names of *ulcus nomæ*, *stomacace*, *necrosis infantalis*, *gangrenous erosion of the cheeks*, *aqueous cancer of infants*, have been successively applied to it. More recently still, it has been described under the name of *noma*, in an excellent thesis published at Strasburg by M. Jules Tourdes.

It is characterized by the more or less extensive mortification of the buccal walls.

Causes.

Gangrene of the mouth is a disease exclusively confined to childhood, and is especially developed in children from three to fifteen years. It is rarely observed in children at the breast. Billard has, however, observed it three times in children whose ages were nine, twelve, and thirty days.

This disease is especially developed in children of the poorer class; in children badly housed, imperfectly nourished, living in low and damp places, and whose constitution is ruined from birth, or afterwards weakened by serious disorders. Thus, the sphacelus is especially observed at the termination of eruptive fevers, and of mucous or typhoid fevers; in the course of pneumonia, of hooping cough, &c. The presence of general alteration of the economy appears then to be necessary for its development.

A final circumstance, which further proves how general and profound is the influence which determines this disease, is that it is sometimes met with in an epidemic form. It is manifested at the same time, in the same places, on a great number of persons. It is not yet known if it is susceptible of being transmitted by means of contagion.

Anatomical Lesions.

When the anatomical alterations occasioned by gangrene of the mouth are studied after death, appearances are observed in the sphacelated parts little differing from those which are remarked in other parts of the body invaded by gangrene. It is the seat only of the disease which can modify these characters and give rise to the peculiarities which will be pointed out further on.

The skin is black, or of a livid red tint, at the situation of the eschar, which is limited by a circle of a deeper and more distinct red. That which surrounds the gangrenous parts soon putrifies and assumes a decided greenish tint. The tissues are generally swollen and infiltrated with an opaline serosity, mixed with some shreds of blood and sometimes with a reddish sanguinolent serosity.

The eschar varies in extent; its form is generally irregular; its tissue is blackish, softened, infiltrated with liquid, and is easily torn,

exposing to view filaments of mortified cellular tissue. According to M. Baron, there are sometimes found in its interior, portions of non-gangrenous adipose tissue infiltrated with a yellowish serum. The buccal mucous membrane presents a very intense blackish colour; it is softened and becomes detached with the whole of the eschar.

In some cases the mortification is confined to the mucous and subjacent tissues, without involving the skin. The extent of the eschar is very variable; its characters are in other respects the same as those just described.

The gums are also mortified to a more or less considerable extent. They are blackish and softened; often, indeed, no trace of them remains; they have disappeared during life. The maxillary bones are denuded, sometimes necrosed; the teeth, when there are any left, are loose and are easily removed, if they have not already fallen out.

The condition of the vessels and nerves of the mortified parts has been investigated, but the results of the examination are contradictory. Billard has dissected the nerves, arteries, and veins of the cheek, and has found them perfectly intact. M. Taupin affirms that he always found them mortified like the other tissues and impossible to be recognized. MM. Rilliet and Barthez have at last, by means of numerous observations, been enabled to give no more precise notions on the changes of these parts. It appears, from the researches of these authors, that the vessels remain healthy while they partly run through an infiltrated part; that their walls are thickened in the neighbourhood of the eschar; and lastly, that they are obliterated by dense or softened clots, when they are examined in the midst of the mortified parts. The duct of Steno, which is very often included in the eschar, remains permeable and may be easily recognized, and merely assumes the colour of the tissues in the midst of which it is placed.

The mucous membrane which lines the rest of the mouth is sometimes observed considerably thickened, infiltrated with serum, and presenting a very decided livid red colour. At other times it is simply reddened and sprinkled with numerous spots of thrush.—(Billard.) The tongue is swollen and ulcerated in various places. These lesions do not present anything remarkable.

In the other organs lesions are observed, proper to the most ordinary complications of gangrene of the mouth. In children at the breast the small and the large intestines are often affected. They present the changes which will be described in the chapter on entero-colitis. The lungs are the seat of a hypostatic congestion, in the midst of which, patches of lobular pneumonia are frequently observed. Billard has once met with pleurisy and pericarditis. Lastly, M. Baron points out the effusion of serum into the arachnoid and into the ventricles

of the brain as a constant phenomenon, possessing some relation to the disease we are now considering. This relation, however, is far from being proved.

Symptoms.

According to M. Baron, gangrene of the mouth is rarely a primary disease; it is developed in children weakened by previous diseases; in children of the poorer classes, and especially in those who constantly reside in low and damp situations. It is frequently observed at the termination of acute exanthemata, the progress of which has not been uncomplicated; thus it is often manifested at the end of measles, or scarlatina, when the eruption has not appeared regularly or when the child remains very weak after the termination of these diseases. It is also observed after confluent smallpox, the pustules of which have furnished an abundant suppuration which has weakened the patients. Lastly, it is observed to follow mucous fevers in scrofulous children, and the scorbutic affection which has been looked upon as the disease itself is only one of its causes.

In all these cases, the gangrene is always preceded by aphthæ or by ulcerations situated on the internal surface of the lips, of the cheeks, or on the gums. These last-mentioned parts are not always the first attacked. These ulcerations may remain a variable time before degenerating into a gangrenous disease.

Thus, over the situation of the aphthæ a thin greyish eschar forms, which becomes detached and leaves the ulcerated surface of the mucous membrane exposed. The tissues become inflamed; in their thickness a more or less considerable spot of induration is remarked; one degree more and the mortification of the buccal wall is established.

When the disease is thus far advanced, the breath possesses a characteristic fœtor, called *gangrenous fœtor*, and the saliva, secreted in great abundance, acquires an insupportable odour. The submaxillary glands are swollen. A considerable swelling without change in the colour of the skin is observed on one of the cheeks, in the middle, or chiefly at the inferior part, below the condyle of the jaw. This tumefaction is due to the engorgement of the cellular tissue; it corresponds to an internal eschar, situated at the angle of the reunion of the gum with the mucous membrane of the cheek, or upon the internal surface of this part.

This symptom, deduced from the external aspect of the patient, is very important; in many instances it is sufficient to make a skilful man predict the series of symptoms about to be developed.

The induration very quickly extends itself, and then there becomes developed around it a serous infiltration of the skin, an infiltration which invades this side of the face, and quickly reaches the eyelids.

The skin in its turn becomes involved. It is at first shining in consequence of the tension resulting from the infiltration of the soft parts; it soon loses its brightness, and becomes covered with a reddish marbling. A phlyctena, filled with a sanguinolent serum appears on its surface. It then assumes a livid red tint, and lastly, changes to a black colour.

The gums often present the same changes of colour, which, moreover, correspond to the same alterations of nutrition. Sphacelus destroys them, and the denuded alveolar arches are often invaded by necrosis, the teeth loosen, and soon drop out of their alveoli. They are detached on the slightest effort, or are carried away with the saliva.

The eschar is of variable extent; the mortification is often, moreover, to the middle of the cheek; sometimes it has been observed to extend itself, and to gain the commissure of the lips, which are in their turn invaded. In some rare instances, all this side of the face, even to the eyelids, is destroyed by the gangrene; the appearance alone of this disease is fearful, and the odour is moreover an addition to all that is repulsive in this disorder.

The general symptoms are far from being in relation with the extent and gravity of these alterations. The absence of reaction is especially remarked in children at the breast. This disease does not otherwise differ in this respect from what is observed in the other diseases of this period, which are very seldom accompanied by a continued fever possessing always the same degree of intensity.

Billard has very forcibly pointed out this circumstance. "At this age," says he, "there is no febrile reaction. The children have a quiet pulse, the thirst is moderate, and they have a considerable appetite, even when the greater part of the cheek is converted into an eschar." The same phenomena are observed in children of more advanced age, as we may conclude from the facts reported in the work of MM. Rilliet and Barthez, and in the articles of MM. Guersant and Blache, published in the *Dictionnaire de Médicine*.

The general condition, however, becomes very serious. The expression of the face is quite changed; the skin is of an extreme paleness; the eye is depressed and surrounded by a dark circle; the lips are livid, and the child falls into a prostration from which it is difficult to recover it. The pulse becomes daily more feeble; the temperature of the body lowered, and the extremities cold. The tongue remains moist and swollen; the thirst is slightly marked; if the want of drink is manifested, it is especially from instinct, and in order to wash away the noisome drivel which is found in the mouth. Children with gangrene of the mouth rarely vomit; the disturbances of the digestive canal are characterized by numerous alvine evacuations which further contribute to weaken the patients.

Progress. Terminations.

We admit, with Billard, two stages in gangrene of the mouth; in the one, the local symptoms are observed precursory to the sphacelus; in the other, which commences at the instant of the formation of the eschar, includes the progress of the mortification, either to the elimination of the mortified parts or to the death of the patients.

It is difficult to determine the first stage in a decided manner, for the precise epoch of the gangrenous transformation of the aphthæ is not always known. It seldom lasts more than seven days.

The second stage lasts from five to six days, and sometimes it is further prolonged for a much longer period before the arrival of the fatal termination.

Death is nearly always the consequence of sphacelus of the mouth. This disease, at first of small extent, local, if we may use the expression, rapidly gains in surface, and involves the entire organism, which becomes poisoned by the absorption of the deleterious products. If the patients resist this poisoning, it is only to succumb to the gradual exhaustion which the suppuration established after the detachment of the eschar determines.

In some very rare cases, reported by MM. Baron, Constant, Guersant, and Blache, the cure of the sphacelus has taken place after the detachment of an eschar of slight extent. All the patients for ever preserve deep traces of the disease by which they have been attacked. Sometimes fearful deformities result from it.

We are indebted to Dr. Hueter for some details upon a very uncommon cause of death in gangrene of the mouth; it is death by hæmorrhage at the moment of detachment of the eschar. In fact, in one patient, this occurrence was twice repeated, on the fifth and on the thirteenth day. Death was the consequence of it.

Complications.

The most usual complication of gangrene of the mouth is lobular pneumonia, a consecutive disease brought on by the state of prostration of the children, and by dorsal decubitus. Diarrhœa is also frequently observed. This phenomenon is purely inflammatory at the commencement of the disease; when it appears at the approach of its fatal termination, it is then only a sign of collapse, like colliquative diarrhœa. In three cases of gangrene of the mouth, reported in the work of Billard, there are two in which thrush was observed on the buccal mucous membrane; the third presented a double complication—both pleurisy and pericarditis were observed.

Gangrene of the anus and of the vulva are sometimes observed in children already affected with sphacelus of the mouth. Other gangrenous affections have been also observed to appear in different parts

of the body. This is, in my opinion, a weighty reason for the belief in the existence of a general alteration of the entire economy.

[At a meeting of the Medico-Chirurgical Society of Edinburgh a case was related of spontaneous gangrene in a child eight months old. The gangrene had appeared on the head, face, and hands, and the appearances were well illustrated by a series of casts. The right ear and the entire hairy scalp were of an intensely black colour, and on both cheeks patches existed about the size of a half-crown piece. The right thumb and the backs of both hands were similarly affected. The child was noted to have been restless and feverish on May 22nd, and on the 23rd a slightly darkened ring was found to have formed round the thumb, about the middle of the first phalanx; in a few hours the whole thumb was gangrenous, and the dorsum of the hand became involved. On the ear the gangrene commenced with the appearance of a flea bite, and subsequently extended rapidly to the scalp, assuming a remarkably regular form, and giving the child the appearance of wearing a black skull-cap. The pulse was observed to be very feeble, and the mouth to be unaffected. Death took place in twelve hours from the first appearance of the gangrene on the thumb, the child being sensible and continuing to suck well up to a few minutes before death. Its previous health had been tolerably good. The only medicine it had been taking prior to the supervention of the gangrene was a little ipecacuanha wine and carbonate of soda, for an attack of hooping cough, from which it was convalescent.

This case would appear to be the result of blood poisoning. The symmetrical disposition of the gangrene, the suddenness of its approach, and the rapidity of the fatal termination are worthy of remark.—P.H.B.]

Prognosis.

When the children are not placed in too unfavourable circumstances with respect to regimen and to hygiene, and if the sphacelus is not too much extended, we may hope to cure them. If, on the other hand, they are weak, if the disease involves a large surface, no hope for their preservation can be entertained. Well characterized gangrene of the mouth is almost entirely beyond the resources of art. It can only be advantageously attacked at the moment of its appearance, and then it must be treated without hesitation.

Diagnosis.

Gangrene of the mouth may be confounded with a disease, the appearance of which is very nearly the same and the progress of which is essentially different—I allude to malignant pustule. As M. Rayer has pointed out, gangrene of the mouth commences in the mucous membrane, whilst, on the contrary, the seat of malignant pustule is on the skin on the external surface of the cheek.

Gangrenous aphthæ, which have sometimes been confounded with sphacelus of the mouth, are distinguished by their small extent, their slight depth, and the absence of the hard nucleus in the thickness of the soft parts. It is when this induration is formed that there is threatening of gangrene.

The scorbutic gangrene of the gums is too distinct from gangrene of the mouth to be ever confounded with this disease.

The diagnosis, then, of buccal sphacelus does not present great difficulties. The odour alone is sufficient to characterize it. There can be no possible mistake with respect to it. The presence of ulcerations on the surface of the mucous membrane, and the rapid formation of a nucleus of induration in the soft parts, suffice to give warning. This induration is betrayed externally by a swelling, which gives to this side of the face a peculiar appearance—for the features have lost their harmony; the colour of the skin is not, however, altered. As soon as it becomes reddish, there can be no further doubt as to the diagnosis; the disease is perfectly well characterized, and more cannot be expected.

Treatment.

At the commencement of the disease we must endeavour carefully to make out the starting point of the disease. From what is said it is to be supposed that the disease is not yet much advanced. In fact, at the time of the appearance of the symptoms the cheek is swollen, and encloses a nucleus due to the tumefaction of the tissues situated beneath an internal eschar. If it is vigorously cauterized in the interior of the mouth, with nitric or hydrochloric acid, this treatment is certain of opposing the progress of the symptoms and of protecting the cheek against the disorganization which threatens it.

When the sphacelus is characterized externally by a light marbled tint of the skin at the spot of a deep infiltration, the mouth must be cauterized, and powerfully cauterized, two or three times a day. It will be proper treatment to cauterize externally, so as to arrive at the deep tissues. This means may further avoid the loss of considerable substance, for the sphacelus may be limited to the points of action of the caustic.

If the eschar is well established, and if it is not of too great extent, the attempt may be made to destroy it by acid cauterizations, or by the cauterization by means of the actual cautery. Several authors even propose to circumscribe the eschar with caustic, in order to limit the progress of the modification; this is an impossible operation. Let one imagine, in fact, the small cheek of a child perforated by a small eschar, and let it be observed that a part of the face is destroyed; the caustic cannot be applied around, there is no room without the invasion of the neighbouring parts; it is much better, then, to cauterize the spot of the eschar itself.

Although assured of the possible action of caustics, or, to express it better, of their efficacy, we must be discreet in their use. They should be employed against commencing sphacelus, and even against

established sphacelus, when of small extent. If the mortification is considerable, the child should not be put to useless pain; every operation is superfluous; it is impossible to arrest the disorganization of the tissues; death is inevitable.

When liquid caustics, or the actual cautery, are applied, they should be used with the greatest care; it is often necessary to cauterize every two or three hours, and the state of the parts should be watched to stop the operation as soon as the gangrene appears to be limited. Constant has derived great advantage from the employment of the acid nitrate of mercury; but, as this caustic may become absorbed and give rise to a mercurial salivation, it should be proscribed. The same may be applied to the chloride of antimony, the sphere of the action of which is difficult to limit. The caustics above indicated are the only suitable ones.

The treatment by caustics is the only one which it is absolutely indispensable to employ against gangrene of the mouth; its action, however, may be aided by means possessing a real value, destined to reëstablish the general health of the children. To this end, tonic and ferruginous preparations are employed. The iron should be administered concurrently with the decoction or the extract of bark, with Bordeaux wine, or with the generous wines of Spain, if there is no contraindication derivable from the state of the patients. The children should be well nourished, notwithstanding the state of the mouth; and, as mastication is impossible, liquid aliments can only be employed, such as broths, soups, &c., frequently administered.

We should also endeavour to modify the surface of the gangrenous parts by means of stimulant ointments, the styrax ointment for example. The wound should be powdered over with a mixture of charcoal powder and powdered bark. When the eschar is ready to become detached, and when a noisome sanies, which it is dangerous to swallow, runs into the mouth, precautions should be taken, and means employed, which are far from being useless. The children should be placed on one side, the head being inclined towards the diseased side, and injections should be made into the mouth, at frequent intervals, of a mucilaginous or aromatic decoction, decoction of marshmallow, or of the infusion of sage and rosemary, to which some aromatic wine may be added. If the stench is excessive, a small quantity of the chloride of soda may be added to these liquids. Lastly, in the treatment of gangrene of the mouth, mercurial frictions, as well as the applications of leeches, must be proscribed. The first of these means, by reason of its specific action on the mouth, acts quite contrary to what is desired; and the other may become the source, if the leech bites inflame, of a fresh mortification of the tissues.

7TH. ON THRUSH.

Something new is acquired by medical science every day. It was thought that all that appertained to the disease known under the name of *thrush* was wellnigh exhausted; it appeared that the symptoms, the progress, and the nature of this disease were perfectly determined, when an important discovery is made, causing doubts to be raised, and setting aside the opinions up to this time accepted as indisputable.

Thrush is a stomatitis of a peculiar nature, which engenders *epiphytes* on the buccal mucous membrane. It is characterized by a species of cryptogamia which is deposited on this mucous membrane, under the form of small white spots of a curdy appearance.

This disease was regarded by the ancient authors as a simple or gangrenous ulceration of the digestive mucous membrane. Later authors have described it to us as a papular or vesicular eruption of the nature of aphthæ; Boerhaave, Van Swieten, Bateman, who called it *aphthæ lactantium;* Plenck, *aphthæ infantilis;* Sauvages, *aphthæ lactamen*, &c. Lastly, another opinion has been put forth, in which thrush was regarded as an inflammation of the buccal mucous membrane with pseudo-membranous exudation, analogous to that of coryza and diphtheritis. Such, at least, are the ideas expressed by Gardien, Underwood; by MM. Guersant,* Lelut,† Valleix,‡ and by Professor Trousseau.‖

It may, however, be stated that thrush does not resemble aphthæ, for there is no vesicular eruption on the surface of the buccal mucous membrane. Neither must we adopt the opinion so well defended by M. Lelut, who, by analogy, allies the false membranes of mucous membranes to the product of thrush, and regards this production as being of a pseudo-membranous nature.

Thus, the miliary and curdy white patch, which forms the indispensable character of thrush, is not a false membrane at all, as has been considered and taught up to the present time; it is not the result of an abnormal secretion. It is a new product of a cryptogamic nature developed on the mucous membrane; it is a vegetable parasite which is formed in particular circumstances, and according to the laws of the so-called spontaneous generation of the infusorial vegetables, such as have been described by M. Dutrochet.§ They are, in fact, microscopic mould, cryptogamia discovered by a micrographic naturalist, M. Gruby, who has given an excellent description of them,¶ the truth of which I have had many opportunities of verifying.

"A portion of thrush being submitted to the microscope, it is

* *Dict. de médicine;* nouvelle edition.

† *De la fausse membrane dans le muguet; Archives de médicine;* t. xiii, 1827.

‡ *Clinique des noveaux-nés.* ‖ *Leçons cliniques de l'Hôpital Necker.*

§ *Mém. sur l'anat. et la physiologie des vegetaux;* t. ii, p. 190.

¶ *Comptes rendus de l'Académie des Sciences.*

observed to be composed of a mass of cryptogamic vegetation. This product has the appearance of conical elevations of .97 inch in diameter; each cone is made up of separate bodies furnished with roots, branches, and sporules.

"The roots insinuate themselves in the cells of the epithelium, they are transparent cylinders, having a diameter of $\frac{1}{400}$ of a millimeter; in their development they perforate the whole series of cells of which the epithelium is composed, in order to arrive at the free surface of the mucous membrane.

"The stems, which appear on the surface of the epithelium, are also transparent, divided at intervals by partitions, and enclose corpuscles in their interior. They resemble the cylindrical rectilinear roots, having a length of $\frac{1}{4}$ of a millimeter, and a breadth of $\frac{1}{400}$ of a millimeter. The stems divide into branches, which become subdivided by bifurcating at a very acute angle.

"The branches are composed of distinct oblongated cells, which enclose in their interior two or three transparent nuclei; sporules are observed here and there on the sides, and their extremity especially exhibits a very great number. The diameter of these sporules is from $\frac{1}{200}$ to $\frac{1}{500}$ of millimeter.

"These cryptogamia are very analogous to the mycodermes of tinea favosa, and appear to resemble the genus *Sporotrichium*, described by some botanists."

They are met with in the thrush of infants, in the thrush of adults, and in the white patches developed on the surface of blisters, on certain wounds and ulcers of the legs.*

No doubt can now exist on the vegetable nature, or rather on the anatomical structure of the production of thrush.

In a natural historical point of view, this discovery is highly interesting, but, in a medical point of view, it possesses much less importance than might be imagined. What matters it, after all, whether the disease we are now considering be characterized by the presence of cryptogamia or of false membrane? Is it on this account the less a pathological production which derives its origin from a morbid state of the individual? Does it in any way change the aspect of the disease, or the course of the symptoms? No. The treatment is not thence modified; for in therapeutics, experience selects beforehand the means to be employed, without awaiting the sanction of theoretical views.

To sum up, then: thrush is formed by cryptogamia of the genus *Sporotrichium*, deposited on the surface of the buccal mucous membrane, under the form of more or less numerous white specks, very like small portions of curd.

* On this important point consult the excellent work of Dr. Ch. Robin, *Des végétaux qui croissent sur l'homme et les animaux vivants.*

The nature of thrush being thus precisely made out, we shall now describe the different forms of this morbid product, its seat, its mode of production, and the phenomena which accompany its development; we shall then speak of the causes which favour its appearance, and the means which should be employed for its destruction.

Form, seat, and characters of thrush. Cryptogamia of thrush coalesce to form small whitish specks of a curdy appearance. At first, disseminated and isolated, of roundish shape, they coalesce so as to constitute larger and irregular patches, pellicles of a greater or less thickness which form a layer, like the membranous exudations. They sometimes present a yellowish colour, which may even assume a brownish tint; but this modification appears to be of no importance. Their consistence is at first rather great; they afterwards become softened, and are easily crushed under the finger, like the pultaceous concretions. They soon become moveable, and are easily detached by a slight friction, which does not implicate the subjacent tissues.

They are developed in the follicles of the mucous membrane, as one of my friends, M. Gubler, has quite recently observed. Originating in a glandular cavity, which they easily fill, they then extend through the orifice to spread externally, under the form of a small rounded eminence of a milky whiteness, so that the whole of the production very much resembles the form of a pomegranate.

If the orifice is too narrow, the byssoid filaments distend the glands beyond measure, and thin their walls to such an extent that they appear to form sub-epithelial tumours. M. Gubler has never clearly perceived specks of thrush situated between the raised epithelium and the mucous dermis; but he does not deny the possibility of this special development.

Thrush, then, is developed on the surface of the epithelium, with the aid of the contract of air; and observation here confirms the truth of the laws laid down by H. Dutrochet on the intervention of air in the spontaneous generation of vegetable infusoria. But there is no air beneath the epithelium; thrush, then, can only be observed on the surface.

However, if the epithelium of the mucous membrane is not locally destroyed by the vegetation of thrush, the membrane itself presents a general modification which it is well to know. It must be one of the conditions necessary to the development of this product, the appearance of which it always precedes; it is constant and especially appreciable in adults; it is more apparent during life than after death.

This modification consists in a state of softening of the epithelium, of dryness and acidity of the mucous membrane. This always presents an unnatural shining appearance, principally on the tongue, which appears to be stripped of its usual covering.

The cryptogamia of thrush are at first developed in the mouth, on the edges and posterior surface of the tongue; on the internal surface of the cheeks; on the hard and soft palate; on the internal surface of the lips; and lastly, in the pharynx and œsophagus.

I have had the opportunity of observing in the practice of Professor Trousseau, a really curious example of thrush in the œsophagus. The cryptogamic vegetations were so confluent that, soon coalescing, they formed a canaliculated layer spread over the mucous membrane of the œsophagus; this tube adhered but very slightly to the subjacent tissues, and received the food in its interior.

[Virchow (*Verhandlungen der Phys. Med.;* 1852) gives the particulars of a case of a child seven weeks old, in whom the œsophagus was completely blocked up by a solid cylinder of apthous product. On transverse section there could not be found any trace of a central canal, the mass reached as far as the cardiac orifice. Under the microscope it showed the well known numerous threads and spaces, with remnants of ingesta, milk, epithelial formations, &c. In the lungs, some masses were also found.—P.H.B.]

It is also said that thrush has been observed in the stomach, in the small and large intestine. Facts of this kind have been reported in the works of MM. Lediberder, Billard, and Valleix. In a child which presented the productions of thrush in the large intestine, I have traced the extension of the disease to the mucous membrane around the anus.

In the intestine, thrush detaches itself very readily from the mucous membrane, and becomes mixed with excrementitious matters, with which it is ejected. It is difficult to recognize, in consequence of the analogy it presents with the fragments of caseum, so numerous in the digestive tube of young infants. Microscopical examination is the only means by which it can be recognized, and by which all error on this head can be prevented.

In conjunction with thrush, a series of very varied pathological changes is met with. The buccal mucous membrane is usually red, and sometimes presents ulcerations of a greater or less depth. Changes of the same nature exist in the stomach and intestine; they are always observed more frequently in the latter of these viscera, the mucous membrane of which is injected, softened, and ulcerated in various parts; pale, on the contrary, hypertrophied, and presenting traces of old cicatrices in the case of chronic inflammation.

Tubercular or granular phthisis, chronic pneumonia, white swellings, &c., may also, in their last stage, be complicated by thrush. Such conditions I have many times observed. They then develop themselves in a subject weakened and exhausted by hectic fever, a very favourable circumstance to the germination of cryptogamia.

In a word, in order to specify all which relates to the concomitant lesions of thrush, it must be observed that this phenomenon may develop

itself in all the organic changes capable of producing cachexia and death, of which it is often the precursory symptom.

Causes.

It is difficult to appreciate the circumstances which favour the germination of thrush, if it is necessary to detail precisely the causes which bring on the general disposition necessary to the development of this product.

Thrush is a disease of the children of the lower orders, and of children imperfectly attended to, badly cared for, and nourished by hand or by the sucking bottle, rather than by a good nurse. It is a very frequent disease in the hospitals for children, and especially in the wards appropriated to infants, which require more attention than the other children.

It is observed more frequently in winter and in damp weather, in consequence of the catarrhal affections which originate in these seasons.

Thrush is a disease of all ages; it is, however, more frequent amongst children at the breast than at any other epoch of existence. It is occasionally met with in the adult; in this case it is always symptomatic. The possibility of its development in the child, whilst in the mother's womb, has been mentioned, but this assertion is erroneous. The presence of air is necessary to the development of this cryptogamic plant. Its generation, then, in the centre of the liquor amnii, is impossible, inasmuch as the child has not been in a condition capable of respiring.

Thrush only reigns in an epidemic manner when the diseases, in the course of which it develops itself, are of this nature. Idiopathic thrush never appears in the epidemic form.

It is always symptomatic thrush which takes on this form; it is also only assumed in the hospitals, the sojourn in which is such a source for all the diseases in children, and especially of entero-colitis.

Thrush is not contagious after the manner of infectious diseases, like smallpox for instance; but it propagates itself like certain cutaneous diseases—itch or favus, for example. It is transmitted by direct contact: this is also the opinion of Baron, Billard, MM. Valleix, Trousseau, Guersant; and the last of these authors states that he has seen the thrush of the nursling communicated to the breast of the nurse.

This opinion is not that which Dugès has adopted. He considered thrush transmissible by indirect contact, like smallpox or scarlet fever, relying on this fact, that a child in good health had acquired the disease by sucking a nurse who had given the breast to another child affected with thrush. This fact may be true, but its interpretation is vicious, and besides, is not sufficient to sanction an opinion so opposed to the results of the most common observation.

SYMPTOMS.

Whatever may be the nature of thrush, it is evident that this product constitutes a morbid state, with the concomitant phenomena of which it is useful to be acquainted. To this end the conditions in which it develops itself must be appreciated; the lesions of the mouth and the lesions of the organism in general must be separately studied in order to compare them together, and to discover the evidence which separates them or which allies them.

Important modifications take place in the mouth which render the spontaneous generation of thrush possible. Here is a material fact, easy to appreciate, one which cannot be mistaken, and which should be regarded as that preparation of the tissues, indispensable to the development of the cryptogamic plant.

These changes are less easily appreciated in the mouth of children than in that of adults. They are characterized by a transformation of the epithelium, which becomes shining, dry, glutinous, and apparently destroyed. The mucous membrane acquires an unnatural redness and heat, becomes the seat of a very painful smarting; the tongue is especially altered in its appearance. It becomes red, and its papillæ are more apparent than in a natural state. Its coating tends to disappear, and according to the observations of M. Gubler, it constantly presents the signs of a very decided acid reaction; it is even to this acid state of the mucous membrane that the development of the cryptogamia must be attributed.

These alterations are those of stomatitis; but they would not suffice to favour the germination of thrush, did not another cause of a more elevated kind come in aid. In fact, stomatitis exists very frequently without thrush appearing. The intervention of a second influence is then necessary; and this it is which fertilizes the soil and renders it fit for the development of the parasite.

What then is the influence which becomes added to the alterations of the mouth? This, the study of the lesions of the organism which coincide with thrush will readily demonstrate. Let us state it in advance: it is on the one hand, the state of health which bad hygiene determines, and on the other, the cachexia which follows inflammation of the viscera.

The cryptogamia of thrush are sometimes developed in children who are apparently in good health, and do not present any appreciable organic lesion, but who are in a decided state of weakness, bordering on a chloro-anæmic disposition; this is what is called *idiopathic thrush*. I have collected several examples of this in the practice of M. Trousseau.

In this case, the lesions of the mouth are the only ones which are appreciable. There is no fever nor gastric irritation. The patches of thrush are developed on the tongue, the internal surface of the

cheeks and lips never become confluent, and disappear in some days under the influence of the most simple attention.

This variety of thrush is but very seldom developed in town; it is especially met with in hospitals. The children in whom I have observed it belonged to very poor families; they had suffered for a greater or less length of time from the indifferent nourishment of the mother; they were badly cared for, imperfectly nourished, deprived of those attentions which surround the rich; the only air they breathed was the indifferent quality enclosed in the rooms of the children of the poor, or in the long and dismal wards of our hospitals. All were feeble, attenuated, slightly developed for their age. In my opinion, there was not one of them who could be looked upon as enjoying a good constitution and a perfect state of health.

Thrush is much more frequently observed amongst children labouring under an acute or chronic disease. This variety is termed *symptomatic* thrush; it is, in fact, the expression of several morbid states, which, without having any relation between them, constitute the general influence necessary to its development.

Symptomatic thrush is observed in the course of all the chronic diseases of children, and especially at the approach of the fatal termination of these diseases. The production of the cryptogamic plant is very rapid and the patches very numerous. At first small and isolated, they rapidly increase in volume, coalesce, and form a very confluent eruption. It is sometimes met with in very thick layers, capable of obstructing deglutition if they extend as far back as the pharynx. It is in symptomatic thrush that small, not very numerous ulcerations, with an ash-coloured base, are met with on the surface of the buccal mucous membrane, which much resemble those produced by aphthæ.

Whatever may have been stated, symptomatic thrush has no general symptoms which are peculiar to it. It can only possess the symptoms of the diseases in the course of which it is developed. As these diseases are numerous, it consequently follows that its symptomatic expression is very varied.

There is, however, one disease which especially appears more favourable than many others to the generation of thrush, this is entero-colitis.

All the symptoms of intestinal inflammation are successively observed. These symptoms are diarrhœa, vomiting, erythema, and ulcerations of the buttocks, groin, and malleoli; fever, with a quotidian remission in conjunction with a rapid emaciation; the buccal mucous membrane becomes dry, inflames, and possesses an acid reaction; thrush is developed; it invades the mouth, determining obstruction to suction and deglutition; it does not alter the symptomatic expression of the

inflammation of the intestine. It lasts a greater or less time, disappears rather easily, and is in like manner reproduced until the cure or the death of the child.

Thrush also appears in the course of pneumonia, or of pulmonary phthisis, in children who do not present any changes in the alimentary canal. I have observed it in the course of chronic hydrocephalus, and no other reason could be assigned for its origin except the cachexia of the child.

To resume, then: it is observed that there are two varieties of thrush, the idiopathic and the symptomatic.

Both of these forms are allied to a general disposition of the individuals; the first depends on a bad state of the constitution, and the second on a disturbance of the health caused by an organic disease.

Thrush has no symptoms but those which result from the inspection of the mouth, that is to say, the local symptoms.

The general symptoms do not appertain to thrush; they are those of the diseases in the course of which this production is developed. Uusually these symptoms are those of enteritis; but those of pneumonia, of tubercular phthisis, of hydrocephalus, &c., have been sometimes observed.

Evolution and duration of thrush. It is important to be acquainted with the evolution of the product which constitutes thrush. Apart from the general symptoms which result from the derangements of the organism, or from the varied alterations occurring in the organs, and which for these motives we pass in silence, phenomena are observed in the mouth which it is necessary to mention here. These phenomena relate to the evolution of the cryptogamic plant. Their successive appearance should be regarded as the true progress of the disease.

Thus, taking into consideration the general condition of the individuals, the different organic modifications which derange their health; raising these causes to the degree of a powerful influence, the force of which is in relation with its more or less remote origin, an influence which dominates over the patients, and disposes them to the germination of thrush; let us see what takes place in the mouth.

The mucous membrane becomes acid, red, hot, and painful; its epithelium smooth and very shining. Four and twenty hours afterwards, or at most after three days, one or more cones of cryptogamia appear, under the form of small white specks, scarcely visible. Each of these is formed by the *Sporotrichium* of which we have spoken; it increases by intussusception, forms a larger cone, which becomes less and less adherent, and becomes detached naturally in the space of four days. As many cones, so many phenomena similar to those we have just described.

As their germination is not instantaneous, and as this operates in

a successive manner, it thence results that, to a certain extent, and to one who does not examine very perfectly, thrush lasts from ten to twelve or fifteen days, because it is detached and reproduced in other situations.

The whole of the concretions of thrush readily disappear in those children who are but slightly indisposed, and who have idiopathic thrush. These cryptogamia disappear with the same facility amongst children attacked with symptomatic thrush, but they are reproduced, and thus return three or four times in the course of the disease. M. Trousseau and myself have observed children attacked with entero-colitis for some months, who had had thrush at four different intervals, and who died still having thrush; not that they were poisoned by this cryptogamic plant, but because they had either a very advanced inflammation of the digestive canal or a chronic disease of the lungs.

Prognosis and Terminations.

The germination of thrush always indicates, amongst children who are attacked by it, a decided degree of innate weakness, or a serious morbid state produced by acute attacks, or lastly, a more or less advanced cachexia, the consequence of a chronic disease.

The presence of these cryptogamia is, then, a serious sign. However, it must be observed that it adds nothing to the state of the children, that it does not aggravate their position, and that it is just the same thing with the disease, before and after the appearance of the thrush. When it supervenes in a chronic disease, it always indicates that the termination will be speedily fatal.

There is only one circumstance in which thrush can of itself be of any consequence, or should merit our attention; this is when, by the confluence of the vegetations, it presents a material obstacle to the introduction of nourishment into the stomach. With the exception of this accident, which is very rare, thrush is very innocent in its nature.

It has never caused death; and the statistics formed on this disease can be scarcely comprehended. It is said, M. Baron has observed 140 children attacked with this disease, and 109 have died. According to M. Valleix,* from whom this extract is borrowed, he himself had twenty-two deaths in twenty-four patients. This is no wonder, since all laboured under entero-colitis, complicated in eight of them with pneumonia, and in the ninth with meningitis. One might die from a less amount of disease; and certainly the cryptogamia of the mouth did not in the least contribute to this result.

In fact, death is never the consequence of the disease which is called thrush. To enunciate such an assertion, is to be deceived in

* *Clinique des maladies des enfants nouveau-nés.* Paris, 1838; p. 202 et suiv.

the strangest possible manner. In forty-two patients whose cases I collected at the Necker Hospital, fourteen laboured under idiopathic thrush, and not one has died. In the others, the appearance of this cryptogamic plant was symptomatic of a visceral disease. Twenty died: twelve of these had chronic entero-colitis, complicated in five by tubercular pneumonia; four had acute entero-colitis; three pneumonia; and one hydrocephalus. The remaining eight were affected with entero-colitis, or worn out by phthisis. They left the hospital still labouring under thrush.

In the children who died, we cannot hesitate as to the cause of death, nor for a moment waver between the vegetable parasite, situated on the mucous membrane of the mouth, and a visceral disease which always precedes the appearance of this product.

[The same error in ascribing to thrush a frequent cause of death, is observed in English practice, for on reference to the returns of the Registar General, I find the following cases registered:

	1845.	1846.	1847.	1848.	1849.	Total of the quarters.
Quarter ending December . .	46	61	52	48	38	245
,, September. .	105	113	82	77	67	444
,, June	45	40	35	49	35	204
,, March . . .	50	35	38	40	38	201
Total in the different years .	246	249	207	214	178	

And in 1849, for the whole of England, 567 males, 565 females; making a total of 1132 cases.

And in London, during the same year, 91 males, 88 females; making a total of 179 cases.—P.H.B.]

Treatment.

Local therapeutical agents are sufficient to cause the disappearance of idiopathic and of symptomatic thrush.

The mucilaginous decoctions and infusions of marshmallow, linseed, &c., are proper to make use of in the form of injection, or of a gargle when the patient is of an age to be able to use them.

The substitutive medication, recommended by Boerhaave, Van Swieten, Stoll, Sauvages, &c., is much more suitable and is very rapidly successful.

M. Guersant recommends the use of a mucilaginous decoction, to which he adds a fourth part of the liquor of Labarraque, or of lemon juice. It is applied by means of a pledget of lint, which is introduced into the mouth of the children. This physician has also derived some advantage from a weak solution of alum.

Dr. Hencker has recommended the solutions of the sulphate of zinc, in the dose of fifteen grains to $\bar{z}$ j of lettuce water. A. Duges suggests the employment of applications, in the composition of which the vegetable acids, vinegar, lemon juice, &c., enter. M. Bretonneau has found good results from calomel mixed with powdered sugar, and

placed in the mouth, in the dose of half a grain, three or four times a day.

At the Necker Hospital, M. Trousseau constantly employs the following application, it is always followed with success:

Borax, honey—of each 75 to 225 grains.

Mix: to be applied three or four times a day to the diseased parts by means of a pledget of lint.

I have very often seen this topical medication employed, and under its influence the cryptogamia of idiopathic and of symptomatic thrush, shrivel, and become detached in twenty-four or thirty-six hours.

Thrush seldom resists these means. If it should do so, it should then be attacked by cauterization with the nitrate of silver, in order to arrest it before it becomes confluent.

In thrush the diet need only be restricted when the disease is allied to a serious acute malady; otherwise the children should be nourished as much as possible.

The general therapeutical means which we are obliged to make use of in this disease, do not appertain to thrush, for in simple thrush, local treatment suffices. It is only in symptomatic thrush that these means become necessary. They are then employed, less against the lesions of the mouth than against the lesions of the intestine, of the lung, &c., so frequently complicated by the presence of this product.

It is useless to speak of the treatment of these diseases; it will be found detailed in the most suitable place.

APHORISMS.

238. A gaping mouth, separated, dry, blackish lips, are indications of ulcerous stomatitis.

239. Frequent cauterizations very quickly cure ulcerations inside the mouth.

240. Gangrene of the mouth is a disease of childhood.

241. An aphtha become gangrenous is always the starting point of the sphacelus which invades the walls of the mouth.

242. Gangrene of the mouth is usually developed in enfeebled children, imperfectly nourished, lymphatic, and situated in the midst of unfavourable external hygienic circumstances.

243. Gangrene of the mouth is sometimes epidemic.

244. Gangrene of the mouth often coexists with gangrene of the anus and of the genital parts.

245. Gangrene of the mouth is announced by fœtor of the breath, quite peculiar, described under the name of gangrenous fœtor.

246. The extreme fœtor of the mouth, united to an acute and circumscribed engorgement of the buccal wall, indicates the invasion of gangrene.

247. Gangrene of the mouth, involving a large portion of the skin of the face, is fatal.

248. Gangrene of the mouth, extending to the face, may lead to the mortification of the gums, the detachment of the teeth, and the necrosis of the maxillary bones.

249. Gangrene of the mouth can only be effectually cured at its commencement under the influence of a deep cauterization, repeated two or three times a day, and performed by a brush moistened with hydrochloric acid.

250. Pure hydrochloric acid is preferable to all the other caaustics in the treatment of gangrene of the mouth.

251. The particular stomatitis which modifies the secretion of the buccal mucus and renders it acid, engenders thrush.

252. Thrush is a vegetable production which is developed in the follicles of the buccal mucous membrane before spreading itself over the surface of this membrane.

253. Small whitish, discrete or confluent granulations, similar to specks of curd, and scattered on the mouth, characterize thrush.

254. Thrush is rarely a primary disease in children.

255. Thrush usually appears towards the termination of all the serious acute diseases, and in the course of chronic diseases.

256. Thrush usually indicates a serious general condition.

257. The thrush which appears on the adult, announces an approaching death.

BOOK IX.

ON THE DISEASES OF THE STOMACH AND INTESTINES.

CHAPTER I.

ON DIARRHŒA.

Diarrhœa is a very common disease amongst the newly-born, and amongst children at the breast; it is often very difficult to appreciate its nature with exactitude. It presents itself under the most varied forms; sometimes it results from functional derangements of the

intestine without organic change of its tissue, sometimes these alterations are present. It is important, however, to know how to distinguish between these varieties, to prevent the commission of the most serious errors in therapeutics.

With this view, and in order to obviate the inconveniences which might result from a mistake, the history of the diarrhœa of young children will be described, taking care to separate from it in the work that which is the result of various inflammations of the intestine. This is the only method of conveniently studying and of comprehending all which relates to this morbid phenomenon.

Diarrhœa is characterized by the frequency of the alvine dejections, modified in their physical and chemical qualities. There is an augmentation of the products of the secretion of the intestine, and a mixture of these products with the excrementitious matters.

History.

In the latter ages, most authors who have traced the history of diarrhœa have evidently taken the diarrhœa of adults as a model, without taking into consideration the varieties which this phenomenon presents when it is developed amongst children. Some of them have described, in a more special manner, the diarrhœa of dentition, the diarrhœa dependent on worms (Sennert), the diarrhœa of sucking children (Sauvages), the mucous diarrhœa, or mucous fever, very common in attenuated children and those subject to worms.—(Stoll. Aphor. 376.) Not one has made the diarrhœa of infants the object of a particular study.

The special treatises date from an epoch near to our own. They are all distinguished by a common character which is the uncertainty of the diagnosis of the disease. Their authors too often unite catarrhal diarrhœa with inflammatory diarrhœa. But we have no right to be severe; the very limited state of our knowledge on the pathological anatomy does not permit us to do better. Thus, what Etmuller refers to lymphatic fever is applicable to these two varieties of diarrhœa. The remittent fever of Armstrong, Butter, and Underwood, comprehends them both. The same may be observed of the gastric fever of Hufeland, and of the description of the diarrhœa given by Gardien.*

In this age, authors have generally fallen into the opposite extreme. In their too exaggerated tendencies of localization, they have referred to enteritis a considerable number of cases of catarrhal diarrhœa which do not involve anatomical modifications of the tissue of the intestine.

Thus, Billard admits four kinds of inflammation of the gastro-intestinal mucous membrane susceptible of bringing on diarrhœa. The first is, erythematous enteritis, to which the thrush of the mouth is

* *Traité d'accouchement.*

allied. The second is also an erythematous enteritis, with alteration of the secretion of the intestine, and the production of thrush in its interior. The third is constituted by the inflammation of the follicles of the stomach and the intestine; it is follicular enteritis. The author regards it as being peculiar to the newly-born. Lastly, in the fourth kind, properly termed enteritis, are observed injection, ulcerations, softening and gangrene of the mucous membrane; in a word, all the disorders which characterize inflammation of this membrane.

M. Valleix, in his excellent work* makes no mention of catarrhal diarrhœa. All the examples of diarrhœa which he comprises relate to enteritis combined with thrush, and some, to the number of three, to simple enteritis.

It is under the denominations of gastro-intestinal inflammation and of typhoid fever that MM. Rilliet and Barthez, in their work, express the results of their obversation upon the digestive canal. The facts which they report are very learnedly analyzed; and, according to these authors, diarrhœa should also be subordinate to the alterations of the texture of the intestine. In this work, however, a very curious fact is observed, sufficient, in my opinion, to overthrow so exclusive an opinion, and to draw attention to catarrhal diarrhœa. A child died with all the symptoms of an acute entero-colitis. The digestive tube was in the most perfect state of integrity from one end to the other.

Many facts of this kind, added to the numerous cases of children attacked with passing and transient diarrhœa, have at length demonstrated that it was impossible, invariably, to refer to organic lesions the flux of the bowels, which depends on the simple lesion of the secretory functions of the intestine. A mixed opinion has originated; and a considerable number of physicians, amongst whom I may mention MM. Trousseau, Barrier, equally admit the catarrhal and the inflammatory diarrhœa.

M. Barrier justly separates the simple functional lesion and the functional lesion accompanied with a modification of texture. He is of opinion that the nearer the period of birth is approached, the more frequent is the phenomenon of supersecretion from the intestinal mucous membrane, without being, however, dependent on gastro-enteritis. Like M. Gendrin, he designates this state under the name of diacrisis, and he passes in review the acescent diacrisis provoked by the acidity of the digestive juices; the follicular diacrisis which results from the hypersecretion of the muciparous follicles, to which inflammation and hypertrophy of these glands often succeeds. It then becomes the history of gastro-enteritis.

[Great is the diversity of opinion respecting this disease. We are told by some, that there is no such disease *per se*, but that it is simply the name of a single

* *Clinique des maladies des enfants.*

symptom of several allied disorders. One asserts that it consists in general or local inflammation of the intestinal mucous membrane or of ulceration of its follicles. Or that it is one of the aggregate of symptoms attendant upon some inflammation or softening of the linings of the digestive tube. Others would state, that whilst in many cases the above statement would hold good, it would not in all, and that it is not always easy to say, during life, which would be correct. They would show that the same lesion is common to many forms of diarrhœa, or the lesion generally met with in a particular variety may be wanting after death, though during life we might have fairly inferred its existence. Some assure us that the best view of the matter is to accept only two forms of the disorder: viz., a functional or catarrhal diarrhœa, or a diarrhœa of irritation, and an intense or inflammatory one, a diarrhœa of organic lesion. Whilst another would produce proof that from the examination of no less than three hundred and thirty-six cases, he could only come to the conclusion that "hyperæmia of the brain and its membranes, anæmia of the lungs and of the liver, and the viscid exudations of the serous membranes, constitute the anatomical results found as proper to diarrhœa;" (Bednar, *Die Krankheiten der Neugebornen;* 8) that there is no such thing to be demonstrated in infants, either microscopically or anatomically, as catarrh of the intestinal mucous membrane; that its chronic form, or "muco-enteritis chronica" must be described as a symptom of "tabes;" that he has never seen "dysentery" in children at the breast; and that in all probability the cause of their diarrhœa is to be sought in a "kind of fermentation," "a primary abnormal process of decomposition of the contents of the stomach and intestines."—Bednar, *Op. Cit.*

Dr. Eichstedt states, that in diarrhœa, not of a chronic character, "dissections have afforded very opposite results; that no change was constant, except viscidity of the blood in obstinate cases.—*Ueber den Durchfall der Kinder;* p. 31.

Much of this discrepancy has evidently arisen in a defective analysis and consequently too limited a generalization on the one hand, and in a too sweeping synthesis and too universal a generalization on the other. The former may be instanced by Rosen von Rosenstein, with his fourteen kinds of diarrhœa, one from overloading the stomach, another from acridity of bile, one from the retrocession of cutaneous eruptions, &c.; an example of the latter is afforded by Rilliet and Barthez, in describing the results of their observations on affection of the digestive tube, under the terms of gastro-intestinal inflammation and typhoid fever.—*British and Foreign Medical Chirurgical Review;* vol. xi.

West is "forced to acknowledge that the distinction was one rather of degree than of kind, or, perhaps it would be more correct to say, that our observation has not hitherto been minute enough to enable us to draw the line of demarcation strictly between the two affections."—*Op. Cit.;* p. 392.

Not only are the lesions answering to the same symptoms sufficiently different, but also there is not always to be found a proportionate intensity between the one and the other; for whilst on the one hand, we may have entero-colitis severe or slight in its symptoms during life, and its lesions evidently so after death, we find other cases very intense, symptomatically, but slight, anatomically considered; and likewise the converse.—Rilliet and Barthez, *Maladies des Enfants;* tom. i, p. 510.—P.H.B.]

Division.

The preceding observations should clearly demonstrate how laborious the study of the diarrhœa of infants is, and how difficult it is to refer so complex a symptom to its true origin.

This affection results from a functional lesion, with supersecretion of the intestinal mucous membrane. It may be occasioned, first, by a simple acceleration of the peristaltic movement of the intestines, which too rapidly impels the matters of the stomach towards the anus, as is observed in cases of indigestion; and in consequence of acute moral impressions, as fright; second, by the increase of the secretion of the intestinal mucosities, which has been termed catarrh of the intestine. Cold, which suppresses the cutaneous secretions; too substantial or too exciting articles of food, which irritate the mucous papilla, determine this catarrh; third, lastly, by an anatomical modification of the tissues depending on inflammation.

These three orders of phenomena, either separated or united, are of a nature to produce diarrhœa. But who does not observe the enormous difference which separates them. The two first exist nearly always simultaneously, and without any organic alteration of the intestine taking place. The diarrhœa which depends upon them has been termed *idiopathic diarrhœa*, or, more properly, *catarrhal, nervous, or spasmodic diarrhœa.*

To the third order, *symptomatic diarrhœa, or inflammatory diarrhœa*, that is to say, *enteritis*, must be referred.

There are two kinds of diarrhœa; one, the anatomical cause of which escapes us: it is independent of the alterations of the digestive tube; this is *catarrhal and spasmodic diarrhœa;* the other is dependent on the above alterations. We shall describe it under the name of *inflammatory diarrhœa*, or *entero-colitis.*

On Catarrhal and Spasmodic Diarrhœa.

Spasmodic diarrhœa is that which is developed amongst infants in whom the alimentary canal preserves a perfect state of integrity. It is very common during the period of suckling. It is determined by the great susceptibility of the bowels, which, at this age, are easily disturbed by the most varied causes. Thence results a nervous excitation of the muscular tunics of the intestine, a true spasm capable of occasioning the flux of the bowels. This diarrhœa is evidently as far removed from the anatomical alterations of the intestine as the perspiration which covers the forehead of a frightened man, and the tears shed by an anguished heart, are also, the one, from a febrile reaction, the other, from diseases of the lachrymal gland.

In fact, amongst children who die from other diseases than those of the digestive tube, and who have had diarrhœa during life, no alteration in the intestine is often met with. No one can deny these facts. They belong to the pathology of adults; I look upon them as examples of catarrhal diarrhœa.

But, in more rare circumstances, the same absence of pathological

alterations is observed amongst subjects who die from the exhaustion produced by diarrhœa, without there being a special modification in any of the other viscera. MM. Rilliet and Barthez, in their treatise on enteritis, relate a case of this nature. I have observed a second, to which we shall have occasion to return farther on. I was of opinion that the child was labouring under entero-colitis; the *post mortem* examination demonstrated the fallacy of this opinion.

Causes.

The causes of spasmodic diarrhœa are very varied, and are for the most part recognized in the causes of diarrhœa termed inflammatory, which may lead to the opinion that there is only a difference of degree between these two kinds, still more so as it is observed that very often the latter succeeds the former.

These cases are, the state of weakness developed amongst children situated in unfavourable hygienic conditions; nourished without precaution, who suck too frequently, and receive food too substantial for their age; the nervous state occasioned by the action of cold, by personal moral impressions, fear or anger; by the suffering a tedious dentition; by the presence of intestinal worms; by the mysterious influence exercised on a nursling by a mother too easily impressionable, whose mind is continually agitated by fears, by chimerical inquietudes, and by the various moral or sensual impressions; lastly, by the influence of eruptive fevers, which are very often accompanied by this variety of diarrhœa.

A. The unfavourable hygienic conditions, in the midst of which diarrhœa is most frequently observed, are the bad quality of the air which the children respire, and the uncleanliness which surrounds them.

Notwithstanding the numerous researches of which the composition of the air has been subject, no account has yet been given of the changes which it undergoes, and of the deleterious qualities which it acquires in consequence of the crowding a great number of sick patients in the same place. It becomes corrupted without our being able to detect the nature of the molecules which poison it. Its influence is manifest by effects so much the more redoubtable the more they are unattended to. It becomes the germ of a crowd of epidemic, and even sporadic diseases. This is a fact so well known to science, that it is useless to insist more on this point. Thence, it is easy to understand why diarrhœa is so common in the hospitals devoted to children, and why the sojourn in the hospital of the *Enfants Trouvés*, or in similar institutions, is one of the most favourable predisposing circumstances to the development of the irritation of the bowels.

To the preceding influence must necessarily be added that which results from the state of uncleanliness in which the children are left,

whether by negligence, or by the material impossibility experienced to give them more assiduous attention. It is, moreover, in the hospitals that this circumstance is met with, when the number of attendants is not in proportion to that of the children.

The susceptibility of the bowels, occasioned by the constitution of the atmosphere and the negligence of hygienic attention, equally exists in the town amongst the poorer classes, the children of whom, brought up in the populous quarters of the capital, are exposed to the privations of poverty. The mothers, obliged to work in order to sustain their existence, quit their infant in the morning, return at several moments of the day to give it the breast, and often leave it, for want of linen, in the most revolting state of uncleanliness.

All these circumstances are obnoxious to the development of the infant, determine a state of feebleness which the most careless inspection discovers, and disposes in an unequivocal manner to diseases of the digestive canal.

B. Diarrhœa is very frequently observed amongst young children abundantly nourished, but without precaution; amongst others whose nourishment is insufficient, and lastly, amongst those who do not suck. The first, in consequence of an ill-directed solicitude, receive from their mother a nourishment too strong for their age, sucking almost incessantly, and taking, in addition, gruel, broth, and very often even the food of the family. In the idea of strengthening the child, indigestions are determined. This is the case amonsgt artizans, and amongst many other persons otherwise well enlightened. It is a diarrhœa which may by analogy be termed diarrhœa *a crapula*, in order to ally it to that which has received this name in the adult.

There are other children, who are suckled by a nurse whose milk is insufficient, and others who are not raised by the breast but by the feeding bottle. These are placed in an opposite condition; they suffer the consequence of an imperfect nourishment.

The proceeding of nourishing the child by the feeding bottle is only to be permitted in want of every other means, for it is very defective, brings on serious inconveniences, and particularly that we are now considering. The milk which is administered to the child is not that of its species. It is a matter of difficulty to procure it of good quality. It is often given at a very unsuitable temperature. Besides, without pretending definitely to settle the question of suckling, which would be out of place, it may be undeniably stated that the mortality of children nourished by the feeding bottle is more considerable than that of children suckled by a nurse, and it may be added that the greater part of these children die in consequence of inflammations of the digestive tube.*

* We have treated of this subject in the first part of this work, in speaking of natural lactation, artificial lactation, and of the regimen of children.

The danger is much more imminent for those who are deprived of a nurse, or of a sucking bottle, and who are brought up by hand. Most of them have frequent indispositions, some of them serious ones, referable to the digestive tube. A great number are carried off by the acute inflammation which succeeds these attacks.

C. The impression of cold, which so easily determines diarrhœa in man, is followed by a similar effect amongst young children. It is in the winter, at the breaking of the season, at the time of the first severity of the temperature, that this symptom is observed. Nothing is easier to account for it in the man than by reasoning with him on his sensations. The same does not hold good with the child in the cradle. The action of this cause can then only be accepted as a very rational analogy, justified, moreover, by the number of catarrhal diarrhœas which are observed in the cold weather.

D. Rosen recommends that amongst children the varied moral personal impressions should be carefully avoided, for he attributes to them a decided influence on the production of diarrhœa. It is quite certain that great fright and violent anger may produce this result. Of this we may be assured on observing what takes place amongst children agitated by the visit and by the investigation of the medical man, as amongst others who are a prey to the fright and to the suffering consequent upon a slight surgical operation. I have more than once observed diarrhœa come on subsequent to the opening of collections of matter on the front and back of the head. Even at the moment of operation the child, surprised and agitated, covered with perspiration, allows the fœcal matters to escape, and some hours after diarrhœa becomes established for one or two days. In this case, however, it is an unimportant and trifling phenomenon.

E. There are few diseases of children which, whether correctly or not, have not been connected, in a more or less distant manner, to the occult action of the dental evolution. There is not one of them which more really deserves this connection than diarrhœa. It is undoubtedly useless to demonstrate a phenomenon now so well known; but it will not be uninteresting to point out in a more precise manner than has yet been done the frequency of this complication.

We have collected the following statistics in the wards of the Necker Hospital, from interrogation of the nurses attached to it. Out of a considerable number of children labouring under their first dentition (one hundred and thirty-eight), we wished to discover what had been the disturbances of the alimentary canal dependent on the dental evolution. A small number (twenty-six) were free from all indisposition. Thirty-eight had uneasiness, colic, and a transient diarrhœa, much too slight to give inquietude to the parents; a diarrhœa the relation of which to the circumstance we are now considering has not

appeared to me to have been justly appreciated by them. Forty-six others had an abundant diarrhœa. It nineteen of these it appeared at the time of the swelling of the gums, and ceased with it, in order to reappear at the time of the eruption of each of the teeth, without anything similar being observed in the interval.*

Amongst the last mentioned twenty-eight, in which the dentition was very tedious, the diarrhœa was of long duration, and gradually assumed the characters of inflammatory diarrhœa. It terminated in entero-colitis.

It is difficult to give a satisfactory account of the relation which exists between the irritation of the bowels and the dental evolution; it is a constant fact, the analysis alone of which remains surrounded by more or less plausible hypothesis.

According to some, the state of pain occasioned by the swelling of the gums determines restlessness and a nervous irritation, the result of which is the increase of the peristaltic contractions of the intestine, and the obstruction to the assimilation of the food. The consequent diarrhœa should be considered as a nervous and sympathetic phenomenon.

There are others who look upon the swelling of the buccal mucous membrane as an inflammatory state, susceptible of extending itself to the mucous membrane of the intestine, and capable of determining entero-colitis.

These two opinions are just; but they become hazardous when one is adopted to the exclusion of the other; both are justified by observation. We must only bear in mind that this diarrhœa, which is connected with the dental evolution, appears to be, primarily at least, and as the progress of the symptoms demonstrates it, a sympathetic phenomenon. It is only at a later period, when the diarrhœa is of some duration, that it assumes the characters of an inflammatory diarrhœa, with all the symptoms which will be pointed out further on.

F. The diarrhœa which is manifested among a great number of children who have intestinal worms, must be referred to the nervous excitement of the muscular tunics of the intestine. It is less surely the result of general sympathetic phenomena than the consequence of the irritation of the mucous papillæ and of the acceleration of the peristaltic movement of the intestine. Like the diarrhœa which is in connection with the irritation of teething, this is primarily independent of the anatomical alterations of the alimentary canal, and constitutes a purely nervous phenomenon. At a more advanced epoch, it presents some of the symptoms of entero-colitis. It also presents its alterations.

* We justly remarked, p. 405, on the symptoms of dentition—"The influence of the dental evolution upon the diseases of the alimentary canal is completely established; it is demonstrated by numerous observations. There are children who constantly experience diarrhœa at the period of the eruption of each of their teeth. The relation between these two phenomena rests, then, on the firmest foundation."

G. If the entire extent of the relation which unites the child to its nurse was understood, it would not be difficult to determine the influence exercised by the constitution and the various diseases of women upon the health of children at the breast. Unfortunately, our knowledge on this subject is very limited, and we scarcely yet possess more than inductions, which experience has not sanctioned. Thus, the most serious diseases of nurses are not, as it is believed, those which have the most fatal influence on the health of the nursling; phthisical women, or those attacked with acute diseases, may continue lactation without an immediate derangement in the health of the children resulting. On the contrary, there are nurses and mothers of so nervous a constitution, that the general excitement caused by the premature return of the catamenia, by moral impressions of every kind, by the anxiety they give themselves in order to worthily fulfil their duties of lactation, determine among them a violent and profound disturbance of the economy. It is in these instances that the most serious symptoms are observed amongst infants, convulsions or diarrhœa. All those who have had the opportunity of investigating the diseases of children, must have have observed, as I have done, women bitterly regretting the unfortunate disposition which has deprived them of the pleasure of nursing their children themselves. They have been the victims of their zeal; they have learnt by painful losses to what extent the moral impressions experienced by the mother may become fatal to the child.

The extent of this influence can be very often proved. I remember having attended a young woman, eminently impressionable, who had suckled her first child, and who had witnessed its death at six months of age in the midst of convulsions. She wished to suckle the second; but the apprehension, the fear of the accidents which might happen, destroyed all her rest. She was in an incredible state of nervous agitation and great suffering, without having had any organic disease. Her milk was rich, and did not present any particular change. In spite of the most judicious precautions, the child was seized on the tenth day with a diarrhœa which nothing could control. It dwindled away; a nurse was procured, and in a few days all the symptoms disappeared. Facts of this kind are more frequent than is imagined; they are only so rare because they often pass unnoticed.

The influence of the diseases, or of the moral impressions experienced by the mother on the health of the children, is then incontestable.* It is to her alone we must often have recourse, as in the case just reported, in order to account for the development of the disease we are now considering, and according to all probability it is the milk which is the intermediate agent of this influence.

* See Part I, On the Influence of Antecedent and Actual Diseases of Nurses on the Health of Children; p. 57.

Donné,* to whom we are indebted for so many interesting researches on the milk, assigns a great importance to the microscopical changes of this liquid. From numerous observations, he looks upon them as the most frequent cause of the appearance of disturbance of the alimentary canal amongst children. Thus, according to this author, in these special circumstances, the milk is impoverished, and contains little cream; the globules are less numerous, and much more irregular than usual; some coalesce into little masses, by means of a mucous material, and here and there rather large corpuscles are observed, very irregular in their outline, rugous on the surface, and formed by the agglomeration of more or less numerous granules. These corpuscles, described under the name of *granular bodies*, are observed in the colostrum. They are present in the milk of nurses whose health is delicate, or who are subject to a considerable febrile action, consequent upon an acute local or general disease.

They are not met with in the milk of those who have experienced strong moral impressions, or who are in a continual state of indisposition and of feebleness, consequent upon the moral and physical prostration which is sometimes developed during the period of lactation.

I have no doubt but that this alteration of the milk by the granular bodies, or still better to express it, this return to the primary state of the composition of the milk, has a great influence on the development of the diarrhœa. It is evident that under these circumstances the alimentation is indifferent, and that it can, as such, produce this result. But what we may be permitted to question, waiting the results of observation, is the nature of the connection, which exists between this alteration and the disease under consideration. In other words, we must ask ourselves if in conjunction with this alteration the appearance of the diarrhœa becomes inevitable. The reply is in the negative, for I have had the opportunity of seeing many children exclusively nourished by a milk of this nature, who have not had diarrhœa.

I would add that amongst the women whose nervous disposition is such as has been previously pointed out, no microscopical change of the milk is present which can account for the development of the diarrhœa amongst their children.

The presence of the granular bodies in the milk of delicate or invalid nurses may then, in some cases, be the cause of the irritation of the children's bowels; but this alteration does not account for all the cases of diarrhœa which are observed and which must be referred to the derangement experienced in the health of the mothers, whether this be a well-determined acute disease or an intense moral affection.

But if the alterations of the milk appreciable by the microscope do not always account for the intestinal flux of young children, the same

* *Course of Microscopie*; p. 410.

is not the case with the modifications of the composition of this liquid. In fact, they are observed in most of the cases so as to account for the production of the symptoms. This results from the analyses made by MM. Vernois and Becquerel, and which have been detailed in the first portion of this work. The milk is then *very abundant*, or *very scanty*, and *concentrated* as regards the solid constituents, so as to be indigestible for young children.

We will lastly mention the diarrhœa of eruptive fevers, which has been termed critical diarrhœa. It is a catarrhal and spasmodic disease, independent of changes in the intestine. It belongs to the variety we are about to describe, rather than to inflammatory diarrhœa.

Symptoms.

The symptoms which reveal the existence of catarrhal or spasmodic diarrhœa are numerous. They must not be confounded with those of the diseases which accompany it. We shall endeavour to avoid all confusion on this head. Thus at the time of the dental irruption, when there is a coincident diarrhœa, the heat, redness, and swelling of the buccal mucous membrane, depend rather on the dental phenomena than on the irritation of the bowels. The same holds good with a considerable number of diseases, cases of cachexia for example, in which the catarrhal diarrhœa should be looked upon as a complication.

Amongst children in the cradle, who are about to have diarrhœa, some unequivocal symptoms of disturbance are to be detected; these symptoms are usually more decided during the night. The sleep is very light, frequently interrupted by cries. The child tosses its limbs about, flexing the thighs upon the belly, and twisting itself on its couch; at the same time, spasmodic contraction of the features is observed, a symptom which still possesses great value, notwithstanding the exaggeration to which it has been subjected.

During the day the child is usually less fretful, is somewhat playful, and is willingly amused with what surrounds it. Now and then it appears in suffering; its physiognomy, suddenly altered, expresses the agony of a transient pain, and its limbs are agitated with an unusual violence. It is heard to utter cries of short continuance, to which quiet or the joyous sports of this age succeed.

There is no fever. It always sucks well but with less avidity; it suddenly leaves off, swallows less easily, and imperfectly retains the milk in its mouth. It often regurgitates, rejects fragments of caseum, and does not vomit foreign matter.

After a little while these phenomena, if they have not been treated by suitable means, increase in intensity. The muscular agitation and the nervous irritation are more violent; true vomitings and a commencement of diarrhœa are observed. The vomitings have not the

character of the regurgitations, which took place without effort as soon as the child had ceased sucking. They take place after any violent shaking. The ejected matters are formed of curdled milk, sometimes mixed with a greenish bilious liquid.

The stools become more frequent, more abundant, softer, and more fluid. They exhale an unsavoury and sometimes a sourish odour, which indicates their acescency. They lose their homogeneousness, and change their colour. From a dark yellow they pass to a clearer tint, comparable to that of yolk of egg. This tint is in its turn modified by the presence of greenish lumps, which give to the excremental matters the appearance of boiled herbs. Lastly, the yellowish colour disappears entirely; it is replaced by a dark green colour, due to the reaction of the acids of the alimentary canal on the colouring matter of the bile mixed with fœces. In these matters are often observed whitish specks of undigested caseum, the assimilation of which has been hindered by the precipitation of the peristaltic movement of the intestines. Their presence in the napkins constitutes the *lientery of children*, a symptom of bad omen which may lead us to suspect the commencement of an intestinal inflammation.

Lastly, in some cases, the matters are yellow when voided, and become green on exposure to the air. This metamorphosis, which so much alarms, has nothing serious in it, and is explained by the reaction of the acids of the urine upon the colouring matter of the bile, which passes from a yellow to a green under this influence.

To resume, then: the uniform colour of the excreted matters indicates that they are *well mixed and homogeneous*, a circumstance quite favourable to the prognosis. The *variegated* colour, on the contrary, indicates the mixture of different matters, that is to say, the heterogeneity, which is only observed in cases of intestinal irritation about to be transformed into acute inflammation. As may be remarked, the frequency and the nature of the stools constitute one of the principal characters by which the true nature of the diarrhœa of young children can be recognized. As to the matters which become green on exposure to the air, this phenomenon need give no uneasiness, and its true explanation has just been given.

In conjunction with the intestinal flux, other symptoms are present which are connected at the same time with the general reaction of the diseased organism, and with the feebleness occasioned by the abundant quantity of the evacuations.

At the commencement of the symptoms, the face becomes pallid, sometimes assumes a leaden tinge; the eyes are slightly sunken, the cheeks collapse and lose their colour. The general plumpness diminishes, the flesh loses its elasticity, and is less firm than natural. Its flabbiness is in relation with the number of stools and with the quantity of

the voided matters. This state is very decided where the alvine dejections are considerable.

The mouth is slightly hot, and often exhales an acid odour. The mucous membrane is red and swollen; if the diarrhœa is dependent on the dental irruption, deglutition is not at all disturbed. The child sucks with less pleasure, and often abandons the breast to return to it again. The appetite does not appear to be disturbed; however, great precautions must be taken in this respect not to satisfy the child, if we would not aggravate the disturbance of the alimentary canal. The tongue remains white and moist; it is never covered by a thick film, nor are the numerous red points observed on its surface, which give it a honeycombed aspect, as in inflammatory diarrhœa; thrush is a rare complication in this variety of diarrhœa.

The abdomen is seldom tense or tympanitic, and is rarely painful. The skin of the abdomen is a little lax, but does not present any spots. The anus and the genital parts are not reddened, nor excoriated, and the erythema of the thighs, which is attendant on inflammatory diarrhœa, is not observed.

If the abdomen is not painful on pressure, we must still believe that it is the seat of dull pains, the nature of which the age of the child does not permit us to appreciate, and which are revealed by the *contortions* of the thorax, the unusual flexions of the thighs on the pelvis: they constitute what may be correctly termed colic. They manifest themselves in the midst of the cries of the child; they appear to be intermittent, and cease after an abundant evacuation.

Spasmodic diarrhœa is rarely accompanied by fever, which is never continued, and when it is observed, it is by remissions, appearing in the day as well as by night, without regular periods of return; it does not last more than from one to two hours; its existence is characterized by an appreciable increase of the heat of the skin, without precursory chill or consecutive sweat, and by a constant acceleration of the circulation. The pulse rises to 120 and 130 in the minute. There is at the same time a sort of calm and somnolence which might deceive, if experience from the observation of children did not demonstrate that this deceitful calm was no other than the depression which results from the febrile action.

Lastly, there is a final series of symptoms on which it is useless to dwell; these are those which are determined by diseases apart from the derangements of the alimentary canal. Thus, we observe children labouring under diarrhœa who are incessantly fretful, and are continually carrying their fingers to the mouth; they are teething, and the gums are red and very swollen. It is evident that these symptoms are less connected with diarrhœa than with stomatitis consequent upon dental irritation. The same holds good with respect

to the convulsions which are connected with teething, and which manifest themselves at the same time as the diarrhœa.

Progress—Duration.

The symptoms of catarrhal or spasmodic diarrhœa never prevent themselves under so serious and rapid a form, but that the gradations can be appreciated and represented in their progress. The exposition of the symptoms has been made so as faithfully to trace the commencement of the disease and the characters which it presents after having acquired its highest degree of intensity. It disappears in some days, the number of which varies between three and ten or twelve. The vomitings cease, the stools are less copious, less frequent; the evacuations, at one time green, become yellow and homogeneous, and assume their natural consistence. Then there is no more colic, no nocturnal agitation, no fever, no febrile depression; the child sucks with avidity; the colour of the face becomes brighter, the plumpness reappears, the flesh becomes firm, everything announces the return to health.

Spasmodic diarrhœa does not always terminate in so favourable a manner. Death may result from it, as we have had the opportunity of observing, and as the case related in the work of MM. Rilliet and Barthez testifies.

Another very fatal and more frequent consequence of this disease is the establishment of an intestinal inflammation. If the phenomena of nervous irritation or of intestinal flux continue too long, the tissue of the intestine becomes changed, and presents the anatomical character of enteritis. This circumstance is specially observed in the diarrhœa which accompanies dentition. This may be easily explained. The irritation which determines the diarrhœa without yet changing the texture of the intestine, continuing to act, becomes by its continuity of action a cause of inflammatory fluxion, in the same manner as the current of air which irritates the conjunctiva, and causes the abundant flow of tears, finally determines the inflammation of this membrane.

Let us not, therefore, lose sight of this important proposition: the spasmodic or catarrhal diarrhœa which lasts too long may become converted into inflammatory diarrhœa, that is to say, into gastro-intestinal inflammation. This termination is also of a nature to cause death.

Prognosis.

Spasmodic diarrhœa is always a serious disease. Although it may not be in any way dependent on alterations of the intestine, it indicates a susceptibility of the bowels which may give rise to gastro-intestinal inflammation. The prognosis given in an absolute manner should then be expressed with a reserve capable of indicating the seriousness of the disease. It should be modified by the nature of the causes which have

determined the symptoms. Thus the diarrhœa which accompanies teething is, *cæteris paribus*, more dangerous than that which is the consequence of the ingestion of aliments too substantial for the age of the child. The one acts in a continuous manner, and very often leads to the anatomical alteration of the intestine, the other exercises too transient an action to produce this result. It is to this difference of action that the difference in the symptomatic expression of the disease is to be referred. This must be borne in mind if we would make judicious use of the resources of therapeutics.

Treatment.

Too much experience and prudence cannot be brought to bear on the treatment of the catarrhal or spasmodic diarrhœa of children in the cradle, that is to say, on the treatment of this variety of diarrhœa which is not dependent on alterations of the intestine. The physician should take into consideration the primary nature of the symptoms, so as not to treat them by too active means, which could not be otherwise than prejudicial to the patient, and which might probably be susceptible, from their composition, of determining a gastro-intestinal inflammation.

Inquiry should be made as to the mode of the alimentation of the child; whether lactation takes place by means of a nurse, or by the feeding bottle, or with the pap spoon. In the first case, the nurse should be the subject of an attentive observation, physical as well as moral; the milk should be examined and analysed in order to recognize its nutritive qualities.* Then the hygienic circumstances with which the child is surrounded should be investigated, its morbid susceptibility discovered, and the progress of the symptoms carefully determined.

By this proceeding, in thus modifying at will the hygiene and alimentation of the subject, we may triumph over the symptoms which it would be useless to attack by the agents of the materia medica. Prudence ensures success. Prophylaxis is, above all other, the most important resource of our art.

The existence of diarrhœa may be tolerated without fear for two or three days, for it often disappears without leaving any traces. This result is familiar to those who have studied the disease of children; I have been able to verify it in the patients under my care and in those which I have observed in the practice of M. Trousseau.

If the diarrhœa persists beyond this period, we should interfere always with moderation, in the double aim of modifying the secretions of the intestine, and of allaying the nervous irritation of its muscular tunics.

According to the circumstances which surround the child, we should effect modifications in its hygiene, alimentation, and perhaps in its nurse,

* See Part I of this work, Analysis of the Milk.

which may be done without inconvenience, as I have previously given an example.

The child should be kept in a mild temperature, sheltered against cold and damp, and the greatest attention paid to cleanliness. After each evacuation it should be washed with a sponge moistened with tepid water, the linen should be changed, so that the contact of the evacuations may not irritate and redden the skin.

The thighs and buttocks should then be powdered with the usual skin powder, or the powder of lycopodium, perfumed with the essential oils of cloves, benzoin, &c.

Although less agreeable than the first, the powder of lycopodium is infinitely superior to it, from the fact that it perfectly carries out the intention for which it is employed. The water glides over the skin which is covered by it, as it would over a varnished cloth.

The child should be entirely restricted to the milk of the nurse, who should be enjoined to give it the breast less frequently. The diet should not extend beyond this. In this case this demi-privation may be remedied by recommending the use of a slight decoction of starch, groats, quince seeds, rice flavoured by orange flower, or by administering a small quantity of powdered gum in milk.

Small cataplasms should be applied on the stomach, either simple, or sprinkled with some drops of laudanum, and enemata of about four ounces at most of the decoction of linseed, bran, quince seeds, or starch administered. For my part, I prefer enemata of less quantity and composed of about three table spoonfuls of liquid, decoction of starch or any other, to which one or two drops of laudanum are added. These enemata may be repeated twice a day. At a more advanced period the following antispasmodic draught may be administered, the results of which are very successful:

Lettuce water	℥ iss.
Syrup of poppies	℥ iij.
Tincture of musk	2 to 4 drops.

A teaspoonful every three hours.

Hufeland fulfilled a similar indication by giving the powder of which the following is the formula:

Carbonate of magnesia, crab's eyes, scraped hartshorn, mistletoe, valerian root—of each equal parts.

To make a powder; as much as will cover the point of a knife to be given once or twice a day.

In some cases, and especially where the breath is acid, the stools very green, and the preceding means have not proved efficacious, a more active and slightly perturbative medication must be employed. About one ounce of the syrup of ipecacuanha may be given fasting,

or what is still better, ipecacuanha powder in the dose of about three grains in an ounce of simple syrup.

Calcined magnesia in the dose of about three grains is also of service, or the use of the following mixture—the formula of which is to be found in Hufeland:

Powdered crab's eyes	7 grains.
Fennel water	℥ j.
Syrup of rhubarb	℥ j.

Shake and give one teaspoonful every hour.

In some cases when the diarrhœa succeeds constipation, slight purgatives must be employed, such as:

Syrup of violets	℥ j.
Oil of sweet almonds . . .	6 drachms to ℥ j.

Or the syrup of chicory in the dose of one ounce; calomel in dose of less than a grain, &c.

It is seldom that it is necessary to make use of all these means or to be obliged to have recourse to rhatanhy, monesia, tannin, and other astringents, of which we shall speak when on the subject of inflammatory diarrhœa. Simple change of regimen is sufficient to calm most of the cases of spasmodic and catarrhal diarrhœa. They only resist when a new element is present to complicate the irritation of the bowels and when the disease is changed into a true entero-colitis. This disease then presents itself with entirely different symptoms and necessitates the employment of new remedies, the detail of which will naturally find its place at the end of the following chapter, which will have inflammatory diarrhœa for its subject.

APHORISMS.

258. The diarrhœa which is very common amongst children at the breast is often independent of inflammation and other material lesions of the intestine.

259. Diarrhœa is a flux which often results from cold, the moral impressions of the child, its imperfect hygiene, over-feeding, carelessness and moral impressions of the nurse, &c.

260. Diarrhœa is often sympathetic of the buccal irritation caused by teething.

261. Diarrhœa is often observed amongst children nourished by the feeding bottle.

262. An abundant or scanty milk, if it is *concentrated*, always produces diarrhœa.

263. The yellowish homogeneous diarrhœa is generally of little importance.

264. The yellowish diarrhœa, becoming green on exposure to the air under the influence of the reaction of the urine, is unimportant.

265. The yellowish green diarrhœa, or that sprinkled with specks of curd, indicates a considerable irritation of the intestine.

266. Abundant serous diarrhœa is always an unfavourable phenomenon.

267. The sanguinolent diarrhœa and intestinal hæmorrhage are very serious.

268. Gentle, progressive diarrhœa, not very considerable and unattended with fever, is not a serious disease.

269. A febrile diarrhœa, lasting some time, announces entero-colitis.

270. Choleriform diarrhœa announces an acute entero-colitis of the highest importance.

271. Catarrhal, spasmodic diarrhœa, is usually very quickly cured.

272. Diarrhœa leads to enlarged belly amongst children.

273. Catarrhal diarrhœa sometimes engenders inflammation of the intestines.

274. It is a great prejudice to keep up the diarrhœa of dentition.

275. Every diarrhœa of any extent should be immediately treated by the medicines susceptible of curing it.

276. In order to cure diarrhœa it is often sufficient to change the nurse, or to regulate the hours of lactation by increasing the interval between them.

277. The nurse may be changed several times until one has been found who suits the wants of the child.

278. Children to whom solid food is prematurely given, and who have diarrhœa from this circumstance, recover as soon as they are nourished on milk.

279. Catarrhal diarrhœa is cured by baths, and by astringents and opiates administered internally.

CHAPTER II.

ON INFLAMMATORY DIARRHŒA OR ENTERO-COLITIS.

Inflammatory diarrhœa is connected in the most intimate manner with the anatomical alterations of the mucous membrane of the small and large intestine. On this account we shall describe it under the name of entero-colitis, so that there can be no doubt as to the precise seat of the disease.

Entero-colitis is one of the most formidable diseases of children at the breast; it is the most frequent of all those that are observed at this age. It presents itself with a remarkable character of unity, which is lost at the end of the second year. It then becomes more and more rare, and its form changes in proportion as the period of weaning is distanced.

Entero-colitis is, then, a disease which is nearly confined to children of the tenderest age. The principal elements of this disease have their seat in the large intestine, and by extension, in the termination of the small intestine, an inverse disposition to that which is observed in typhoid fever, where, as it is well known, the alterations are situate in the ileum extending into the large intestine. The antithesis is complete. The detail of the pathological anatomy justifies this assertion.

Pathological Anatomy.

Changes in the large intestine. Amongst the children whose history I have compiled, otherwise made perfect by *post mortem* inspection, I have been enabled to discover constant change in the large intestine, extending from one of its extremities to the other. In the greater number of cases, this change is confined to the mucous membrane, in others, it extends to the submucous cellular tissue, and, in a small number of cases, it involves all the tunics of the large intestine.

This viscus is usually contracted and narrowed in consequence of the spasm of the muscular coat. In its interior the mucous membrane is thrown into a great number of folds, the summit of which, being constantly irritated by the passage of excremental matters, often exhibits traces of inflammation. This membrane presents a colour which varies from a pale rose to a very bright pink. This colour is due to the presence of a very rich capillary net-work, which assumes two very remarkable dispositions. In one case it covers the whole surface of the mucous membrane; the twigs, anastomosing to infinity, are here and there interrupted by small, whitish, projecting bodies, depressed in the centre, which form more or less apparent spots, according to the subjects. These are the mucous crypts of the hypertrophied intestine, the interior of which is filled by a small quantity of greyish mucus, which becomes emptied on pressure. In the other case, the redness exists at the summit of the folds of which we have spoken. It presents itself under the form of red lines, irregularly disposed, like the folds, in the direction of the length of the colon, or more obliquely, so as to intersect each other, and to form lozenge shaped spaces and irregular parallelograms.

In these places, erosion soon takes place, the tissue disappears, ulceration is established, both prominent in its form, and sinuous like the folds which it surmounts.

These ulcerations are usually very narrow, superficial, and easily overlooked. The edges are a little reddened, not at all swollen, and the base preserves its harmony of colour with the adjoining membrane. A close examination by a good light is necessary in order to be assured of their existence.

Other ulcerations exist in the intervals of the folds of the mucous

membrane. These are also difficult to make out, and contrast with the surrounding surfaces by their slightly inflamed border. They are very small, very superficial, nearly circular. They are placed at the situation of the muciparous crypts (solitary glands), and appear to be formed at their expense. If the disease dates from a more distant period, a great number of these have already had the time to become cicatrized, and there is simply remarked a slight depression on the surface of the mucous membrane, without any change of colour having remained.

The thickening of the mucous membrane is very difficult to prove if it is not considerable. In children who die rapidly, without having lost much of their plumpness, the mucous membrane preserves an appreciable thickness. On the other hand, it is much thinned and appears no longer to exist in those who, having fallen into a state of marasmus, die slowly, and are reduced to a fearful state of emaciation.

Nevertheless, but by exception, there are subjects in whom this membrane is evidently swollen.

The density of the mucous membrane is rapidly changed in entero-colitis. It sometimes resists the traction employed on it, but more frequently it is impossible to raise it in a layer. It detaches itself by small fragments, so great is the softening. We have always remarked these cases coincide with a very vivid redness of the membrane.

With these changes, we may always observe the abnormal development of the solitary glands of the intestine, which, in the ordinary anatomical condition, easily escape observation, and present themselves under the form of isolated points of extreme smallness. They now appear under the form of granulations of from .08 to .12 inch in diameter, but slightly projecting, and situate in the thickness or beneath the mucous membrane. Each of these crypts is pierced by a small opening, through which the mucus escapes. This opening is frequently dilated; the edges are pale and flattened; more often the dilatation results from the ulceration of the tissues, as we have previously shown in mentioning the creatrices which remain on the mucous membrane. These ulcerations are recognized by the redness and the swelling of the circumference, not very evident modifications, but which may be easily appreciated by an attentive observer.

The layer of cellular tissue, which separates the muscular mucous tunics, rarely participates in the anatomical modifications of the acute variety. Its texture is always altered in chronic entero-colitis.

The lesions which it presents are tolerably constant, being confined to simple thickening in the acute form, and to a semi-transparent, sometimes very thick, induration in the chronic variety. The thickening of the submucous layer, developed in acute entero-colitis, never exceeds

.04 inch. The tissue is whitish, slightly indurated, sometimes presenting a semi-transparence, similar to that observed in cases of dysentery. When the disease has been of long duration, the induration is considerable. The tissue is compact, nearly inextensible, of a semi-transparent aspect, lardacious, and cuts crisply.

A remark must here be made on the subject of this alteration; I refer to the narrowing of the colon. The changes which operate in the submucous cellular tissue, take place at the time when the spasm of the muscular tunic diminishes the calibre of the intestine. Thence results an inextensible envelope around a diminished organ, an envelope which forcibly compresses the viscus, and prevents its return to its original volume. Such a state of parts must exercise a deleterious influence over the digestive functions of the child.

The changes in the muscular coat itself are trifling, if this contraction, of which we have several times spoken, and to which we shall not again refer, be excepted. It is the result of a functional derangement, and does not constitute an anatomical alteration, properly so called.

Changes, similar to those of the submucous layer, are sometimes met with in the subperitoneal layer of cellular tissue. I refer to the thickening. We have only met with it twice, and then the modification was not very considerable.

Small intestine. The mucous membrane of the small intestine is the only one of the constituent parts of this organ which participates in the changes of entero-colitis. The lesions which it presents are met with in nearly all the subjects, and extend from eight to twelve inches above the ilio-cœcal valve. They are characterized by a partial injection, more or less intense, of the capillary vessels, with swelling and sometimes softening of the mucous membrane.

The solitary glands are observed on this portion of the membrane either more voluminous than in their normal state, and without ulceration of the orifice; Peyer's glands preserve a perfect integrity, but in some exceptional cases they are observed swollen and softened, but without ulceration of their tissue.

In two cases only have I met with the extension of the preceding alterations, to nearly the entire length of the intestine. The appearance of these changes was, throughout, identical with that just pointed out: namely, injection and tumefaction of the mucous membrane, hypertrophy of the solitary glands, and swelling of Peyer's glands. Moreover, changes similar to those of the small intestine were present in the large intestine.

In two other subjects affected with colitis, the only change observed in the small intestine was a decided whiteness and opacity of the mucous membrane, the consistence of which was entirely destroyed from the pyloric to the ileo-cœcal valve. The glands of Peyer were but slightly apparent.

Stomach. This viscus, which has been made to play so great a part in the production of the diseases of the child at the breast, does not in any way deserve the attention which has been paid it. It is always found half filled with food, the base of which is formed of coagulated milk. These matters, always acid, lie on the posterior surface, and the great curvature of the stomach.

The mucous membrane is usually thrown into folds, pale and of good consistence towards the anterior surface of the organ; it is of a livid pink tint, and diffluent in those parts which are in contact with the liquids above referred to.

In some cases the membrane is softened in its whole extent, and preserves the pale opaque colour above mentioned. To the softening of the mucous membrane may be added that of the other tunics of the viscus.

Mesenteric glands. With the lesions of entero-colitis, the hypertrophy of the mesenteric glands, without colouring or transformation of their tissue, is often met with. The alteration never extends beyond this.

It is only later, at a more advanced period of existence, that we have occasion to remark tubercular degenerescence of these glands. In the child at the breast, this degenerescence is scarcely ever observed; the bronchial glands are the only ones which then present the most marked tendency to undergo this disorganization.

Pathological anatomy of the complications—tubercles. What has been so briefly stated on the subject of the mesenteric glands is likewise applicable to tubercles of the intestine; they are never met with in the child at the breast. As far as I can judge from my own observation, their development does not appear possible except towards the age of eighteen months to two years.

We shall add nothing more in this place on the pathological anatomy of the complications of entero-colitis, for they will engage our attention further on. It will be sufficient to indicate erythema of the buttocks, ulceration of the malleoli, and thrush, as the most frequent complications of this disease.

Redness and swelling of the buccal mucous membrane, ulcerations of the gums and of the arch of the palate, several chronic affections of the lung, some exanthematous fevers, &c., may be also mentioned as anatomical disorders concomitant with entero-colitis. The development of entero-colitis is often consecutive to the organic alterations of the preceding diseases.

[Dr. Meissner (*Grundlage der Literatur der Padiatrik;* p. 850) gives the following *resumé* on the pathological anatomy of diarrhœa.

" If, following the indications of the preceding table, we place together the abnormal states which remain after rejecting general anæmia and tabes (consequences of diarrhœa), the textural diseases of the lungs, brain, meninges,

and serous membranes (constituting the secondary diseases), enlargement of the solitary follicles, Peyer's patches and mesenteric glands (as frequently found in connection with other diseases), and the existence of pus in the umbilical vessels (the presence of which depends upon the age at which the child died), we shall find that hyperæmia of the brain and of its membranes, anæmia of the lungs and of the liver, and the viscid exudations of the serous membranes, constitute the anatomical results found as proper to diarrhœa. To these we must add the thickened tar-like viscid blood, the glutinous, colourless, or greenish or yellow-coloured (often mixed with dark brown flakes) layer lining the stomach, scarcely to be distinguished from the underlying mucous coat of the latter, and extending to a less degree over the cavity of the mouth, the œsophagus, and the intestinal canal, which latter generally contains thin, watery, yellow, or green-coloured contents, and the dryness and firmness of the subcutaneous cellular adipose tissues. The *muguet* of the œsophagus and of the cavity of the mouth (in one case of great neglect and uncleanliness of a nurse-child, it was found in the nostrils and on the gastric mucous membrane), bears a like import to the ordinary fungous-formations taking place on the surface of a fermenting fluid exposed to the atmosphere. The softening of the mucous membrane is the result of the fermentation in contact with the membrane, and which will be afterwards referred to."—p. 46.

The following is his description of the morbid anatomy of the bowels in entero-colitis:

"The diseased portion of the intestinal tube is in general contracted, its contents are fœcal matters, a grey turbid fluid, or the blood introduced into its cavity. The mucous membrane, both of the small and large intestine, or of the latter alone, is mostly folded on itself longitudinally; it appears swollen and injected, and often in the larger bowel is marked with a great number of dirty red spots, from the size of groats to millet seed. The mucous membrane of the latter is frequently coated with a thin, grey, reddish exudation, which occupies several large spots. In other cases a thick stratum of a yellowish, fibrous, firmly adherent exudation, whose surface is occupied by an abundant formation of fungi, covers the mucous membrane of the whole of the colon, sometimes also of the lower ileum, very rarely the latter alone. Besides this, the mucous membrane aud the submucous cellular matter are abundantly corroded in star-like spots.

"In one of the secondary forms was observed, in many parts of the small intestines, a yellowish-grey firm infiltration, like an eschar, which occupied a quarter of an inch of the breadth of the intestine, and in the oblique direction, the whole mucous membrane. At the same time extensive gangrene invaded the axilla."—p. 102.

West, referring to the changes in the glands of the intestine, observes—"This enlargement of the solitary glands is usually associated with increased vascularity of the mucous membrane, which does not however assume the characters of a general erythematous redness, but is confined to that part of the membrane which covers each gland, or which surrounds its base. If the disease advance farther, ulceration succeeds to this inflammation of the glands. A small circular or slightly oval spot appears, upon their summit, and increases in size and depth until it has destroyed the glandular structure and the mucous membrane, and has produced a deep cup-like depression or ulceration, the base of which is formed by the muscular coat of the intestine. On one occasion I observed, in the midst of enlarged and ulcerated glands, some others equally large, but on which the excavated ulcer had not yet formed; their summit presenting a small, round, or oval spot, of a yellowish colour, most probably a minute slough not yet detached from the surface." "On one occasion I found the disease in the lower part of the large

intestine to be so far advanced, that the interior of the sigmoid flexure of the colon and of the rectum presented an irregular tuberculated surface, of an ash-gray colour, which appeared eaten into holes by a number of small, circular pits, or ulcers, with sharply cut edges."—*Op. Cit.*; p. 394.—P.H.B.]

Causes.

It has been established, in the preceding chapter, that between the functional disturbance of catarrhal diarrhœa and the anatomical lesion of inflammatory diarrhœa, there was only a difference of degree; it was even added that the latter is very often the termination of the former. The approximation may be still closer without being in any way contradicted. Thus, the causes of spasmodic and catarrhal diarrhœa are also those of entero-colitis. The same influences of bad regimen, crowding, cold, bad milk, &c., bring on acute inflammation of the intestine. The return to the description which this subject raised in the preceding chapter may, then, be dispensed with, and reference may then be made for more details.

Symptoms.

Entero-colitis is an insiduous disease at its commencement, obstinate in its progress, and often fatal in its result. It is met with in the *acute and chronic state.* In the acute state it exceptionally presents itself under a very violent form, which was formerly described under the name of softening of the stomach, but which is now termed *choleriform enteritis.*

Some children are predisposed to this disease. These subjects are usually pale, dull, and emaciated; the flesh is soft, red, and sometimes excoriated on the buttocks, natural parts, and thighs. These children are placed under unfavourable hygienic circumstances; brought up in the midst of privations, and often of uncleanliness; nourished without management, either too abundantly or parsimoniously; probably fed from the feeding bottle or pap spoon; and, in addition, already arrived at the period of teething.

This disease is also met with, but more rarely, amongst young children very well cared for, and placed in more advantageous external conditions, and consequently different from those we have just pointed out.

At the commencement of acute entero-colitis, the children appear slightly fretful and restless; their sleep is easily broken; they become irritable, and utter cries apparently without cause, throw about their limbs, giving movements of rotation to the pelvis, and flexing the thighs upon the belly. They continue to suck, but without the same avidity as previously; regurgitations are more frequent; the child throws up fragments of undigested caseum. Then a slight diarrhœa appears, characterized by the excretion of yellow stools, still homoge-

neous. There is no fever; the mouth is moist and clean, without any great heat. In some cases an erythema exists on the buttocks and thighs, which indicates that the skin possesses a greater susceptibility than in the natural state.

These symptoms continue in this state for two or three days, and it must be acknowledged, much resemble those of catarrhal diarrhœa. The similarity is such, that at the commencement, it is impossible to establish any distinction. The same difficulty exists in the diagnosis of the catarrh and lobular pneumonia of children of this age.

In both cases, time dissipates uncertainty. New characters unveil the existence of pneumonia; new symptoms reveal that of entero-colitis.

The emaciation becomes apparent, and the flesh loses its firmness in consequence of the rapid disappearance of the subcutaneous adipose tissue. The skin shrivels, especially that of the belly, which preserves the folds made on its surface. The brightness and freshness of the face disappear, the cheeks fall in, and the eyes, depressed and lustreless, sometimes sink in a fearful manner. These changes sometimes take place in twenty-four hours, which is a most fatal omen. When the disease lasts a longer time, numerous wrinkles appear on the face, ploughing it in every direction, and deforming the features in such a manner that a child of some months resembles the most cacochymic and the most ill-used old man known.

The child appears sad, depressed, and suffering. It often cries out, refuses the breast when the nurse offers it, or if it takes it, soon quits it. It vomits the milk coagulated, and often mixed with bilious matters. The regurgitation of the milk, with *efforts of vomiting*, is the most usual phenomenon. It takes place several times in the course of the day.

The mouth very often preserves its natural moisture, only becoming dry in the more serious cases, and the breath is acid. Then the mucous membrane is slightly reddened, tenacious, and is the seat of a considerable heat. The tongue presents a rosy tint at its anterior part; it seldom becomes dry: its surface is white, sprinkled with a number of small red points, which gives it a honeycombed appearance.

The state of the lips is similar to that of the mucous membrane. They are moist in the ordinary state; dry, even fissured, in the most serious form of entero-colitis.

The gums present analogous modifications. They are sometimes stretched and projecting on the spot, compressed by a tooth ready to pierce.

Lastly, ulcerations are often observed on the buccal mucous membrane, and often an accidental production, thrush, the existence of which is allied in the most perfect manner to the disease we are now considering.

Statistical facts demonstrate the truth of this coincidence, and it is very rare to meet both these alterations without at the same entero-colitis being present.

The belly is always swollen, projecting, and appears to be stretched in children labouring under entero-colitis; but this tension is rather the result of the muscular effort occasioned in them by the investigation of the physician, than the result of the disease itself. This tension is much more evident at the time of the cries. When the child can be distracted and the attention called away, the hand which touches the abdomen detects a suppleness entirely natural, and rarely occasions pain. The skin of the abdomen is flaccid, and preserves the fold made by the fingers, especially at a more advanced period of the disease. It never presents any kind of exanthematous eruption.

The diarrhœa becomes considerable. The number of stools increases and becomes raised to ten or fifteen a day. These matters soon lose their yellow colour and present various aspects, the study of which is of some value in the treatment. They also present some chemical properties difficult to specify, which probably may find their application when they are studied on an extensive scale.

1. They are semi-soft, homogeneous, greenish, like boiled herbs; neutral.
2. Semi-soft, homogeneous, green, often acid.
3. Semi-soft, heterogeneous, greenish, mixed with yellowish fragments of ordinary fœces; neutral.
4. Semi-soft, heterogenous, green, mixed with fragments of undigested caseum; acid.
5. Diffluent, greenish, heterogeneous, composed of a great quantity of water in which yellow and green or whitish clots float; acid.
6. Diffluent, greenish like the preceding ones, and mixed with a gas of a fœtid odour; sometimes sourish.
7. Diffluent; completely serous.
8. Stools mixed with blood are very rare at this age. We have only once observed them in a child labouring under acute hepatitis.
9. Yellow stools which become green on exposure to air, only changing colour by the reaction effected in them by the urine.

It is impossible, at least in the present state of science, to determine from the examination of the napkins, from what portion of the alimentary canal the voided matters are derived. Moreover, their intimate nature is not known. We cannot verify the opinion of M. Guersant, who believes that the scarcely tinted liquid stools, which entirely filter themselves away in the swaddling clothes, come from the small intestine. It is evident that to the matters of this intestine are added those of the stomach, and that to the products of the colon is added the residue of the portions which have traversed the preceding parts of the digestive tube.

As to their nature, chemical investigation has not furnished information capable of clearing up this question. It is known, and this is so evident that all demonstration on this head would be superfluous, that the evacuations are in a great measure formed by the residue of the alimentary matters, imperfectly digested, in consequence of the disturbance of the assimilating functions. It is also known, that matters, the nature, action, and reciprocal reactions of which are not very well understood, become added to this primary element. These are the products of the muciparous follicles of the stomach or of the intestine, and the products of the biliary secretion. The muciparous flux is constantly acid, but it is not always so to the same degree, and we are ignorant of the circumstances which augment this acidity, which is easily demonstrated. The biliary flux is alkaline and serves to neutralize the destructive action of the first. In this reaction, and in this mixture of the alimentary matters, a peculiar colour is produced which gives to the napkins the green tint we have previously pointed out. "The bile does not become green except when it is mixed with an acid, and the stronger this acid is, the more intense is the green colour."* Sydenham attributes it to the disturbance of the animal spirits.†

It would, nevertheless, be an error to consider the green colour of the napkins as the uniform result of the acidity of the gastric liquids, for it does not disappear after the internal administration of absorbent and alkaline powders. It should disappear if acidity was the cause of it. *Naturam morborum ostendunt curationes.* It is besides of trifling importance to preoccupy ourselves with its characteristics, which possess but little value in the diagnosis, and which are common to various diseases of the bowels. Thus they are observed amongst many children attacked with diarrhœa, even when they have no entero-colitis at all.

It is seldom that the abundant alvine evacuations do not determine, in consequence of their irritant qualities, erythema of the buttocks and thighs, always followed by ulceration of these parts. The greatest attention to cleanliness is necessary to prevent the production of this accident.

Erythema of the buttocks and thighs is present in five sixths of the cases of entero-colitis. It commences with the disease, and usually appears several days before its invasion. It first consists of a simple redness, sprinkled with reddish papulæ more or less confluent, situated on the buttocks, scrotum, or vulva, and the internal surface of the limbs as far the malleoli. On each of these an erosion of the epidermis takes place, and thus forms as many superficial ulcerations of the skin, the vivid red, bleeding base of which is observed at the level of

* Huxham, *De morb. col. damn.*; p. 19. † *De affectione hysterica.*

the circumference. These ulcerations then extend themselves in breadth and depth, coalesce with the adjoining ulcerations and sometimes present a considerable diameter which even exceeds one third of an inch. Wounds thence result, which, by their number and the space they occupy, constitute of themselves, without considering the principal disorder, a rather serious disease.

Then, these ulcerations present a peculiar honeycombed appearance, which generally indicates the commencement of cicatrization. Their reddish base presents a speckled grey appearance, due, in my opinion, to the exudation of a small quantity of lymph around the orifice of the absorbent vessels. Each of the spots which form this speckling, extends itself and becomes confounded with the surrounding spots, and thence results a false membrane which covers the ulcer. Then cicatrization takes place thus: the work of reparation, far from commencing by the circumference, commences by the centre, and uniformly takes place at the surface of the ulceration, by means of a small false membrane which becomes organized and covered by a new epidermis. After cicatrization, reddish copper-coloured spots remain for a long time, which might be easily mistaken for syphilitic patches if their origin was not known.

With this erythema of the thighs there is frequently observed a redness of the internal malleoli and of both heels, a redness which soon becomes the origin of ulcerations of a different nature from the preceding. They are deep, their base is greyish and dry, their edges inflamed and as if phlegmonous. To M. Trousseau belongs the credit of showing that these accidents are invariably occasioned by the negligence of certain precautions of toilet. They are easily prevented by wrapping the limbs of the child so as to isolate the one from the other, and to hinder their reciprocal friction.

In the midst of all these disorders, the febrile reaction is but slight. The fever is strong, rarely continued, nearly always remittent. It is continued in the first days of the existence of entero-colitis, and is characterized by moderate thirst, heat and dryness of the mouth as previously pointed out, by a rather high degree of animal temperature, and lastly by the acceleration of the pulse which varies from one hundred and ten to one hundred and forty pulsations a minute. But it is still correct to observe that at certain times of the day, at indeterminate periods there are exacerbations in which the heat is carried to a very high degree, and the pulse to a degree of extreme rapidity. The increase in the acceleration of the pulse is not in relation with the increase of the tegumentary heat.

When the entero-colitis is of long standing, and appears to have passed into a chronic state, the fever is truly intermittent. The accessions are not well marked; their duration is variable. They reappear

once or twice in the twenty-four hours, and never at fixed periods. They are not proceeded by chills, and commence by a state of depression in which the heat becomes developed and disappears without being constantly replaced by perspiration.

During the last hours of existence the fever reappears with a continued type, and the pulse remains constantly in a state of considerable acceleration.

Such are the symptoms of acute entero-colitis. We have been obliged to divide in order to describe them. After this enumeration, in order to obtain a complete idea of the disease, it is necessary to reflect on the whole series of the preceding phenomena.

Entero-colitis sometimes presents itself with startling symptoms, which recal those of cholera—this constitutes *choleriform enteritis.* It commences in a sudden manner by numerous, very liquid, serous stools, and by repeated vomitings. In some hours the body becomes emaciated, the face sunken and pale, the features sharp, the nose pinched, the eyes hollowed, the skin loses all its resistance to the finger, becoming discoloured and chilled until the arrested evacuations allow the heat to return, or until the moment when the vital powers, crushed by the disease, disappear under the stroke of death.

On Chronic Entero-colitis.

The symptoms of chronic entero-colitis in the child at the breast are, with the exception of the febrile reaction, very nearly the same as those of acute entero-colitis just pointed out. The modifications of the buccal mucous membrane, the derangements of the stomach and intestine are similar. In addition, the state of the body, which is very much emaciated, the abdomen remaining of very large size, the wrinkled appearance of the face, which deserves the name of senile expression, and the intermittent type of the fever, which changes and becomes continued at the approach of death.

Complications.

Entero-colitis complicates the greater part of the diseases of children at the breast. It is observed with chronic diseases of the lungs and of the skin, with several diseases of the mouth, and especially with the stomatitis which is the result of teething.

It is in its turn complicated by a small number of these diseases. We have already referred to erythema of the skin of the buttocks, and ulcerations at the malleoli; let us add thrush, which is in intimate connection with it, and nearly always becomes developed during the course of this disease.

Convulsive nervous phenomena, which result from the sympathetic influence exercised on the brain by the intestinal affection, are also

observed in some children. These phenomena are rather rare. We have, nevertheless, several times remarked the coincidence of convulsions with entero-colitis. At one time, amongst others, it was in a child one month old, who died after eleven days' illness. The brain was perfectly healthy.

Progress—Duration.

As has been previously remarked, entero-colitis sometimes commences in a very violent manner. These are cases of *choleriform enteritis*. After a day of slight disturbance, with fever and vomitings, the diarrhœa appears, and becomes very abundant; the face suddenly becomes changed, and the eyes excavated in the space of one night, like what it is said takes place in softening of the mucous membrane of the stomach, and the child rapidly succumbs. Recovery seldom takes place. In this case the symptoms gradually disappear, or become prolonged, so as to constitute chronic entero-colitis.

In most of the cases the commencement is less abrupt. The disease becomes developed, like catarrhal and spasmodic diarrhœa, without attracting much attention. The child is indisposed and has slight relaxation of the bowels. The symptoms persist, and then the cause is discovered. They increase and become aggravated if their progress cannot be arrested. The patient daily becomes weaker, and gently arrives at that degree of weakness and emaciation precursory of death.

It is only in exceptional cases that entero-colitis rapidly runs through its stages. It usually lasts fifteen days; the *mean term* necessary to the cure. It sometimes lasts from two to three months.

Few children die before the completion of the tenth day. The greater number succumb by the end of a month; when they hold out beyond this period it is because they are of stronger constitution. The disease may last more than two months.

Amongst those who are cured the disease scarcely ever extends beyond the third week. The chances of cure diminish in proportion as this period is receded from; the disease has then passed into the chronic state, and is much more obstinate to therapeutical means.

Prognosis.

Acute entero-colitis is a very serious disease. It is the more to be dreaded in proportion as the constitution of the subject is more delicate, and the social position in which it is placed is more indifferent where the influence of privations is added to that of unfavourable hygienic conditions.

The choleriform enteritis is still more to be dreaded, and causes death in most of those whom it attacks.

It is very formidable amongst children nourished with the feeding

bottle or the pap spoon, amongst those who are intrusted to a nurse whose milk is poor and insufficient, amongst those whose bowels are susceptible and disturbed by the least deviation of regimen or by the phenomena of teething.

The mortality of children labouring under entero-colitis would be considerable if reckoned from that of the hospitals. Thus, from my researches at the Necker Hospital, in separating children attacked with catarrhal diarrhœa from those attacked with entero-colitis, I find, out of thirty-six patients, the number of nineteen deaths, amongst which seven had pneumonia; seven other children left the hospital not cured, and in a very unfavourable condition; lastly, ten only were cured.

The same does not occur in civil practice, where mothers are found attentive in overlooking the nurses, and in lavishing the attentions suitable to a sick child. The surrounding hygienic conditions being perfect and the regimen well regulated, the diseases of the bowels are accompanied with a much smaller mortality than that we have just pointed out. In town, death is much more rarely observed to be the consequence of the disease we are now considering.

When the disease has once passed into the chronic state, it is very seldom that the children can be cured; for they will eat, and the food which is given them, at the same time that it satisfies them, increases their disease.

Treatment.

Before any step is taken in the treatment of entero-colitis, all the circumstances which relate to the hygiene or to the regimen of the child* should be duly examined into, and should be modified where necessary.

All the fears, to which the subject of the change of a nurse whose milk has been altered, gives rise, should vanish when it is known that this change of nurse is never prejudicial. I have several times recommended it, and have never had occasion to repent it. Dr. Donné† also recommends it, and says that he has changed the nurse of a child five or six times without the slightest inconvenience happening.

Consequently it is necessary to change the regimen of children and to return to lactation by a good nurse, in the case where she who suckles is insufficient. The same proceeding should be put in force in children who are weaned at a period too near to birth. However, if as often happens, the child refuses to take the breast, the feeding bottle must be had recourse to, and it must be put on a milk diet. Fatty soups and meat should be left off, if these aliments have already formed part of the regimen of the child.

* Refer to what has been said on this subject in the preceding chapter.

† *Conseils aux mères sur l'allaitement et sur la manière d'élever les enfants.* 2nd edition; Paris, 1846; in 18.

When these most important precautions have been taken, we should make use, in the treatment of entero-colitis, of the various means which science has placed at our disposal. These means are numerous. All recommend themselves by advantages to which we shall endeavour to give the proper value.

There should be a greater interval between the hours of lactation, soups and solid food should be suppressed, the children should be kept to their room, simple or opiated poultices applied to the abdomen, and a glyster with three spoonfuls of decoction of starch, bran, or quince seeds, with one or two drops of laudanum, according to the age of the children, administered.

At the commencement, several mucilaginous drinks, rice water, toast and water, gum water, decoction of quince seeds, gum in milk, the antispasmodic powders, &c., recommended in the preceding chapter, are often of service; afterwards we must have recourse to more energetic means.

Cutaneous revulsion. In the treatment of this disease, M. Dubois recommends the application of a blister to the epigastrium. It is especially in that class of cases in which the symptoms commence in a violent manner, that is in cases of choleriform enteritis, that this mode of treatment is most advantageous. It is often crowned with success.

Baglivi and Broussais have, however, opposed the employment of blisters as useless and even dangerous in the above circumstance; they are in the wrong. Stoll had already combined blisters with sinapisms in the treatment of obstinate diseases of the abdomen, and derived great advantages from them. Louyer-Villermay has employed them with success, and for my part I never fail to prescribe them as soon as the symptoms assume a certain intensity.

Revulsion on the digestive tube. I thus term the therapeutical method which consists in momentarily establishing on the stomach a secretory irritation, which balances that of the large intestine.

It is often sufficient, at the commencement of an entero-colitis, to administer ipecacuanha to cause the cessation of the diarrhœa, and consequently all the other symptoms. This is a result which I have several times observed in the practice of M. Trousseau, who justly places great reliance on this medicine. The following is the formula:

Ipecacuanha	4 to 8 grains.
Simple syrup	℥ iss.

Mix, for children of from one to two years, to be taken in two doses, with an interval of ten minutes.

The dose may be repeated the next day if it has not produced the desired amelioration. In case it is unsuccessful, it should not be again administered.

Absorbents. As soon as the acidity of the breath amongst children

labouring under entero-colitis is remarked, or when, from the decided greenish appearance of the excrementitious matters, a considerable acidity of the gastric liquids may be supposed to be present, it may be useful to make use of the following neutralizing or absorbent means:

The subnitrate of bismuth in the dose of from two to four grains in syrup, or in milk. Powdered crab's eyes, and carbonate of magnesia in an increased dose, and administered in the same manner. M. Trousseau also makes use of the saccharate of lime, which he dissolves in milk, in order to prevent this liquor from curdling, and to neutralize the acids which become developed in the alimentary canal of children.

Tonics and astringents. In children who are very much enfeebled, it is often very useful to have recourse to the employment of the tonics, which advantageously remedy this general want of tone. The extract of bark or the powder of Calumba may be equally given. The extract, which is very easily administered in very small globules, placed in a syrup or in jam, appears to possess the greatest efficacy. The dose should not exceed four grains. Ferruginous compounds may also be prescribed, either the protoxide, or still better, the tincture of the sesqui-chloride of iron, in the dose of about three drops in a two ounce julep.

Astringents constitute the basis of the treatment of most physicians. Their employment is decidedly indicated. They should be administered by the mouth or by the rectum. The extract of rhatany and of monesia may be given in three-grain doses. Tannin in the dose of one or two grains, nitrate of silver in the dose of .15 of a grain to ℥ iss of liquid. This is the formula of M. Trousseau:

Nitrate of silver	.15 gr.
Distilled water	℥ j.
Syrup	℥ ss.

All these substances may be given as enemata composed of three to six ounces of the vehicle, holding in solution seven to ten grains of the extract of the rhatany or monesia. If tannin is used it should be in the dose of four to seven grains. In the same way and for the same ends, fifteen to thirty grains of alum, or better still, less than one grain of the nitrate of silver.

These last enemata are daily employed at the Necker Hospital. If their use is not constantly followed by success, there always results, at least, a decided amelioration quite capable of dissipating the objections raised against their employment.

The administration of the astringent medicines which the materia medica includes may be infinitely varied. I have only mentioned those which are most frequently employed.

Opiates. In Germany the treatment by narcotics enjoys an unlimited credit, and if we are to believe Hufeland, one of the most eminent practitioners of that country, opium is the "medicine which possesses the greatest certainty." It should be prescribed with the greatest precaution, and in the following manner:

Distilled water	℥ iss.
Syrup	℥ ss.
Laudanum	1 to 2 drops.

A teaspoonful every hour.

The sedative action of this draught may be assisted by means of frictions on the belly with

Ung. Althææ	
Ol. Muscad. āā	℥ iij.
Ol. Menthæ	gtt. 6.
Laudanum	gtt. 3.

Antiphlogistics. Lowering treatment has been recommended by some physicians. Its employment does not appear to be sufficiently indicated by the intensity of the symptoms. With the exception of special and unexpected circumstances, such as, for example, a very strong febrile reaction with turgescence of the general capillary system, it should not be made use of. It would be rather injurious than useful.

Complications. The complications of entero-colitis do not in any way modify the treatment of the disease. They necessitate the employment of some substances which are applicable to them, and of which we shall speak on the subject of each of these diseases in particular. Thus, it it is useless here to occupy ourselves with the treatment of thrush, and of the ulcerations of the mouth, of which we have previously treated.* We shall simply give some rules relative to the cure of erythema of the thighs and of the ulcerations of the malleoli, symptoms which sometimes become very serious. The excavation following these ulcerations disappear on due attention to cleanliness and after frequent bathing with cold water. Care should moreover be taken to avoid the friction of the legs against each other by separating them with a cushion. No fat, no ointment should be used; the same holds good with respect to repellents, the preparation of lead, for example, which may produce fatal convulsions (Hufeland). In order to prevent adhesions, the best means consist in sprinkling the excoriations with lycopodium powder. When large and numerous ulcerations form on the surface of the skin, the sufferings become very great, and the life of the child is in danger. An astringent topical remedy should be used which possesses incontestable specific qualities; this is the bichloride of mercury dissolved in water.

* Diseases of the Mouth; p. 411 et seq.

Of this seven grains should be dissolved in eighteen ounces of ordinary water. A small portion of the salt becomes decomposed, but a sufficient quantity remains dissolved in the liquid to constitute a lotion, which should be applied to the diseased parts several times in the course of the day.

APHORISMS.

280. Inflammation of the alimentary canal of young children is preferably established in the large intestine, very seldom in the small intestine, and still more rarely in the stomach, and well deserves the name of entero-colitis which I have applied to it.

281. Entero-colitis is the natural consequence of improper regimen of children, of bad milk of nurses, of alimentation from the feeding bottle, of the premature use of solid food, whether fatty or otherwise, of multiplied indigestions brought on by the folly of some mothers.

282. Fever, vomiting, green, variegated, or serous diarrhœa, and emaciation combined with great softness of the integuments, announce an acute entero-colitis.

283. Decoloration of the face and sinking of the features lead to the suspicion of the development of acute entero-colitis.

284. The dull, waxy paleness of the face, combined with its flabbiness, and with excavation of the eyes and cheeks, announces acute entero-colitis.

285. A child at the breast which has the buttocks, the interior of the thighs, and the mallioli excoriated or ulcerated, has an acute or chronic enteritis.

286. Enlarged belly, with looseness of the bowels, announces chronic entero-colitis.

287. A cadaverous, senile, and wrinkled countenance in the young child, predicts the existence of chronic entero-colitis.

288. Acute entero-colitis passes very rapidly and very easily into a state of chronic entero-colitis.

289. Chronic entero-colitis, complicated with thrush, immediately becomes much more serious.

290. The complete decoloration of the face, its rapid withering, the extreme and prompt excavation of the eyes, following copious evacuations, announce a state of very great danger, and probably death.

291. Chronic enteritis is almost invariably fatal.

CHAPTER III.

ON CHOLERA.

Many writers very improperly include under the name of *cholera* certain forms of enteritis of young children, accompanied with prostration, emaciation, and considerable evacuations. These are severe forms of choleriform enteritis, if we may make use of this term metaphorically, but they are not true examples of cholera. There is as much difference between the flux of cholera and the flux of intestinal inflammation, however abundant it may be, as there is between the lachrymal flow of corneitis, and that of measles or of moral emotions. It is specificnesss which characterizes and distinguishes diseases, and a secondary phenomenon can never conduce to this end.

Cholera morbus, the true epidemic cholera, may exist in children at the breast, and I have observed several cases of it at the Hôtel Dieu, during the epidemic of 1849. It appeared with its principal characteristics slightly modified by the tender age of the children. Entire families rapidly died, with all their children rapidly carried off by the scourge. Thus, in this epidemic I have seen a child two years and a half old, labouring under diarrhœa for eight days, who was suddenly seized with vomitings, cramps, spasms, and cyanosis, and died at the end of forty-eight hours. Whilst the child was being buried, the mother remaining with her nursling one year old, observed it suddenly swoon in her arms, commence vomiting, void copious stools, utter cries, and at length die after two hours of horrible suffering. In her turn, the same evening, she, having had diarrhœa for four days, was seized with vomitings, cramps, and asphyxia, and died at the Hôtel Dieu. The father soon followed; seized two days after his wife, he died at the end of forty-eight hours.

2*nd Case. Epidemic cholera in a child seventeen months; death.* A woman in the seventh month of pregnancy, nursing a child seventeen months old, was admitted in the Hôtel Dieu with all the symptoms of epidemic cholera. She died two days afterwards.

The child enclosed in the uterus had ceased to move; it had died, it was said, three days since.

The other child, seventeen months old, has also the cholera.

The face is red, suffused, the eyes brilliant, the hands bluish, contracted, warm; the feet bluish, warm; the limbs rigid, the gastrocnemii muscles very hard, in a state of permanent contraction; all the skin of the body tolerably warm.

It cries, and becomes contracted every instant; vomits aqueous matters, and passes frequent stools, consisting of a colourless liquid.

The pulse, which is appreciable, is 120. The child died four hours after admittance.

I could here relate three cases of epidemic cholera in children at the breast, but it is not my wish to lengthen this chapter, and I shall confine myself in comprising them in the recapitulation of the disease.

The cholera of infants and of children at the breast may become developed primarily amongst them under the epidemic influence, and may afterwards propagate itself to the mother who gives them the breast; or, on the contrary, commencing by the mother, it secondarily attacks the nursling. The cholera of children is, then, epidemic; it is probably contagious, but there is nothing well established on this head.

It commences by colic, diarrhœa, vomiting of watery inodorous matters, which have nothing characteristic like the epidemic cholera of adults. The colic is frequently very violent, and appears to cause much suffering to the children, as far as can be judged from their cries. General cramps accompanied by tonic contractions of the limbs, fingers, and toes, afterwards come on; the face becomes pinched and shrivelled, and the eyes excavated; the skin loses its colour, or else becomes of a livid red, bluish, *without true cyanosis;* the chilliness is little marked, the languishing circulation persists to a feeble extent, even at the approach of death. Then, only, does the cry lose its force, and ends by becoming extinguished. At this period also, the cramps become general, and are accompanied by general tetanic spasms. They last until death closes the scene.

I have never seen the epidemic cholera of young children last more than forty-eight hours, and all the patients attacked with it died.

At the *post mortem* examination I have never observed any alteratiou in the mucous membrane of the ileum and of the large intestine, not even that hypertrophy of the follicles which is sometimes noticed in the adult and in the child in many cases of ordinary enteritis.

To recapitulate, then: the epidemic cholera of children at the breast presents itself with most of the ordinary characteristics of this disease; it has appeared to me to differ in a marked manner from the epidemic cholera of adults by the slight intensity of the cyanosis, the slight degree of cold, the aqueous nature of the alvine dejections and of the vomited matters, a more sustained persistence of the circulation, and an exaggeration of the cramps, the extent and form of which appear to approach very closely those of true tetanus. It also differs from it, in possessing a much greater fatality than in the adult, for all the children who were seized with it died, without the possibility of anything curing them.

CHAPTER IV.

ON THE DYSENTERY OF INFANTS.

Dysentery is a very rare disease amongst young children. Its existence might even be denied if it had not been observed at the period of some severe epidemics of dysentery.

Strack relates having observed an epidemic of dysentery in 1757, at Mayence, when he met with several cases of this disease transmitted from the mother to the child, and thus presenting themselves in a *congenital* form. Zimmermann relates the history of a woman of Frauenfeld, who, having had a dysentery for fourteen days, was confined of a child labouring under the same disease, who died at the tenth day. Strack distinctly states that a child born of a dysenteric mother cannot live.

These are rare cases, which I can neither call in question nor criticise, and which I simply cite on account of their peculiarity. Probably the authors above named have described as dysentery a simple intestinal hæmorrhage, frequent enough amongst infants, as will be described further on.

CHAPTER V.

ON SOFTENING OF THE MUCOUS MEMBRANE OF THE STOMACH.

Some years ago, the *gelatiniform* and pultacious softening of the mucous membrane of the stomach amongst children was described as a distinct disease. It must now be confessed that this was a serious mistake, and that in this instance an unfortunate application of the study of pathological anatomy had been made. In fact, amongst young children, softening of the stomach never constitutes an isolated disease, and what has been written on this alteration relates to entero-colitis, as has been previously described.

This mistake would never have been made if the nature of the alteration had been taken into consideration, and if, at the same time, attention had been paid to the other alterations which exist in the same individuals.

Be that as it may, softening of the mucous membrane of the stomach is not a special disease—1st, because the alterations, which are looked upon as the fact of a pathological state, are only the result of putrid

decomposition; 2nd, because the gastric mucous membrane is easily dissolved by the acids of the stomach, which are very abundant in some diseases, such as pulmonary phthisis, entero-colitis, &c.; 3rd, because observation of disease demonstrates that this softening never exists alone, and that it is, on the contrary, always allied to other alterations, which are the cause of it, and hold it under their immediate dependence.

Amongst children who are said to have been attacked with softening of the mucous membrane of the stomach, there always exists at the same time a more or less violent inflammation of the large and of the small intestine. Now, this coincidence well deserves being indicated. It is evident that if the two alterations exist simultaneously there is an occult connection between them, which it is the duty of the physician to endeavour to discover. It is evident that they cannot be separated from each other, and that it is only necessary to seek to discover what is their reciprocal influence, and what is that which, by its anteriority, may have been the determining cause of the second.

Now, here is a case where we can demonstrate the advantages of reflection and judgment over the absolute conclusions which are sought to be drawn from the direct observation of facts.

Thus, softening of the mucous membrane of the stomach is the consequence of entero-colitis. This is the proof: a constant phenomenon accompanies the inflammation of the alimentary canal amongst children at the breast—this is the very great acidity of the liquids secreted by the stomach and by the intestine. This phenomenon is demonstrated by the acidity of the excrementitious matters, and by the green colour of these matters. Besides, it is known (Carswell) that the acid state of the liquids of the stomach is sufficient to cause the artificial digestion of the mucous membrane, that is to say, its softening; it is then certain that all the diseases which have as a result the increased acidity of the gastric fluids should determine softening of the mucous membrane of the stomach. This is precisely what occurs in entero-colitis; this is what may equally happen in the course of other diseases.

Thus, the softening of the gastric mucous membrane, which exists simultaneously with entero-colitis, appears, then, to be under the absolute dependence of this latter disease; but that cannot suffice.

We must show that this softening is really and truly the result of the digestion of the mucous membrane by the gastric acids, and that it is not the manifestation of a particular pathological state, inflammation of the stomach for example: this is what is established by the characters of the alterations themselves. In fact, this white gelatiniform softening of the depending parts of the viscus, or even of its totality, does not in any way resemble the red softening termed inflammatory. It appears to be placed entirely without the ordinary laws of pathological anatomy; its nature is little known, it appears to be much rather the result of inorganic than of organic phenomena.

More is not required in order to demonstrate that in the cases of coincidence of softening of the mucous membrane of the stomach and entero-colitis; it is to this last alteration that the existence of the first must be referred. Consequently the description of the disease should be especially applied to the principal affection, that is to say, to entero-colitis; and then the concomitant diseases should only be feared as a complement placed in the chapter of complications.

To resume, then: softening of the mucous membrane of the stomach in children at the breast is not a special disease which it is necessary to describe by itself.

This alteration is always connected with other diseases, and especially with disease of the large intestine, the knowledge of which fact has been too long neglected.

It is the consequence of the acidity of the liquids contained in the digestive tube of young children, liquids which are very acid in the disease we have above referred to.

It is then useless to describe the symptoms, progress, diagnosis, prognosis, and the treatment of this disease; this would be an error of location. This recital would only be applicable to the principal disease, which determines the softening of the stomach, that is to say, to entero-colitis. We refer the reader then to this chapter, where he will find all that relates to this alteration which should disappear from the nosology of children, as far as regards its consideration as a special and isolated disease.

[Dr. Meissner gives a table of one hundred and seventeen cases in which softening either of the stomach, œsophagus or intestines, or of the lungs, or hæmorrhagic erosion of the gastric mucous membrane existed; he arrives at the following conclusion: "The so-called softening of the alimentary canal and lungs is a result of the fermentative action which occurs primarily in cholera and secondarily in the other affections of children. Softening can invade the mucous membrane during life; perforation of all the coats occurs first after death. It is rarely an object of diagnosis, never one of therapeutics."—P.H.B.]

CHAPTER VI.

ON HICCOUGH.

Hiccough is very often observed amongst young children in good health. It often gives rise to too much uneasiness, for it is a symptom of little importance. But this is no longer the case in sick children; it acquires a great value as an unfavourable symptom in the prognoses.

The convulsive state of the diaphragm which is the cause of hiccough is often determined amongst children who are well, by the avidity

with which they suck. It is known, says Gardien, that a vivid impression may cause the paroxysm of hiccough, which is not caused by an irritant matter, to cease; but it would be very dangerous to have recourse to this means in order to dispel the hiccough amongst children; to frighten them, is always to expose them to great dangers.

The disappearance of the hiccough may be effected by giving some drops of pure vinegar, antispasmodics, and opiates internally; but this means is not suitable for children. In this case cold applications to the epigastrium or the ingestion of small fragments of ice succeed very well. We may hope to get rid of this nervous phenomenon by revulsives to the legs, and still better by the sneezing which follows the inhalation of a few grains of snuff. It often readily disappears under the influence of a curious means proposed by M. Piretti, and which consists in the compression of the circumference of one wrist on a line with the carpus, and more especially compression of the right wrist.*

CHAPTER VII.

ON RETENTION OF THE MECONIUM AND ON CONSTIPATION.

The meconium is a black, tenacious, and pitch-like matter, which is formed in the intestine in the course of intra-uterine life, and which the newly-born infants should void by stool during the first two or three days of its existence. The retention of this matter is always prejudicial to the child. The symptoms which result from it are more or less severe, according to the nature of the causes which hinder this evacuation.

Retention of the meconium is the result of the sluggishness of the intestine or of a material obstacle to the progression of the matters which it encloses in its interior. When in a child there only exists a feebleness of the movements of the intestine, it is easily vanquished by slight purgatives, exciting the muscular system of this viscus. When, on the other hand, there is a material obstacle to alvine dejections, the case is infinitely more serious, and is usually caused by imperforate anus. We shall now successively treat of simple retention of the meconium and of the retention consequent on imperforation of the anus.

A. The meconium is usually expelled during the first two or three days following birth. It however happens that this matter, extensively adhering to the walls of the intestines, cannot be dislodged by the

* *Gazette médicale*, 1850; p. 267.

too feeble contractions of this viscus. It is partly evacuated and the rest remains a much longer time than might be imagined. It escapes very slowly, in small quantities, often without it being perceived, at so remote a period from birth that it would have been far from being suspected that the least atom could be still found in the intestines. Underwood has had under his care children more than one month old, who had been out of health ever since they were born. It was only then that they commenced to void the meconium.

The symptoms which result from this retention very much resemble those observed in the constipation of a more advanced age. There are flatulencies, colics, indigestions, vomitings, or constipation. Sometimes also, very serious nervous phenomena are noticed; but these symptoms are very rare in our country. On the contrary, they are very frequent in the warm climates of the tropics. Thus, the newly-born children in India have often, in consequence of the retention of the meconium, a species of tetanus termed locked jaw or fallen jaw, which commits great ravages amongst them. I have seen convulsions come on in a child who at the eighth day of birth had not yet passed the meconium, I had thought to have established a connection between these two phenomena which are not usually allied to each other, but which in this case have appeared to me to be so.

The expulsion of the meconium should be assisted by acting on the large intestine by means of purgative enemata, or by giving laxative medicines internally.

It is of great advantage to make use of purgative enemata and the excitants of the large intestine, for the meconium only occupies the large intestine. We may succeed very well by administering enemata of about three or four ounces, and composed, the former, with a decoction of linseed with one spoonful of oil, or with a solution of ʒ vj of marine salt, or of sulphate of soda; the latter with an infusion of mercurialis or of senna in about four ounces of liquid.

When these methods are not followed by success, we must commence by giving, internally, slightly energetic purgative medicines. Those should be selected, the action of which causes the least possible disturbance, for often very little is necessary in order to purge a newly-born babe. It is generally sufficient to give them, by mouth, a little syrup of chicory in the dose of one or two spoonfuls.

If the stools are still tardy in appearing, ℥ ss to ℥ j of oil of sweet almonds may be given, or half this dose of castor oil.

If the meconium still delays to appear, calomel should be administered alone or associated with jalap. The first of these medicines is a very useful remedy, for it is without taste; the other, on the contrary, is more difficult to administer to children in consequence of its bitter flavour.

Calomel may be given in the dose of from one and a half to two grains, in powder or in pastilles of half a grain, which is infinitely preferable.

Jalap in powder may be given in the dose of from two to three grains in honey, or mixed up with jam, or with extracts sufficiently compact to form pills which may be covered with liquorice powder or with sugar.

B. *Retention of the meconium, consequent upon imperforation of the anus.* "The inferior extremity of the alimentary canal may present a complete obliteration, which results from the imperforation of the integument at the situation of the anus, and then the rectum terminates in a blind pouch at its inferior part; or rather a part of the totality of this intestine is wanting. In the first case, it contracts adhesions with the sacrum; in the second, it is the inferior extremity of the colon which forms a *cul de sac*, and adheres to the sacrum near the sacro-vertebral angle. It must not be imagined, however, that imperforation of the anus always accompanies the imperforation or the absence of the rectum. This orifice sometimes exists in children whose rectum is obliterated; therefore, this is a circumstance to which the greatest attention should be paid when the symptoms of retention of the fœcal matters is observed. In the case where the rectum exists, but where the anus is imperforate, it is sufficient, in order to give issue to the meconium, to make a puncture, with a straight bistoury, in the spot where the anus should exist, and at the summit of the tumour which appears at each of the efforts made by the child. Then the cicatrization of the external wound should be prevented by means of a tent of lint.

"But when the rectum is obliterated in a great part of its extent, the operation to be practised is very difficult, very dangerous, and rarely crowned with success. We have only to choose between the establishment of an artificial anus at the anterior part of the abdomen, of an artificial lumbar anus, or in the spot where the anus should exist. The first operation is the most easy, but the disgusting infirmity which is the consequence should accord the preference to the other proceeding, which was originated by M. Amussat."*

In this circumstance, the surgeon practises one of those formidable operations which can only be performed in similar cases. He endeavours to establish artificially an anus in the spot where this natural orifice should be situated. To effect this, after having dissected back the parts down to the intestine, he draws it forward, opens it, and fixes it around the anal orifice, by means of several sutures. One of these operations has succeeded. It may be imagined how highly dangerous it is, but it is preferable to that which consists in the establishment of an artificial anus in the child, which devotes the wretch who

* Chailly-Honoré, *Traité pratique de l'art des accouchements.* 3rd edit.; Paris, 1852.

bears it to a miserable existence. Is it not, in fact, preferable to naturally reëstablish the excremental functions in a child, than to seek to save it at the price of the happiness of its future existence? On this point there can be no doubt in the mind of any one.

On Constipation.

Constipation is a much more rare symptom in infancy than at every other epoch of life. The younger the children, the less common is this tendency; it is a rather serious disorder, and may be the source of symptoms which sometimes become very formidable.

When, in spite of the constipation, the child enjoys good health, it is useless to counteract its natural tendencies; but if the child suffers, as is frequently the case, with flatulency and colic, it becomes necessary to dispel this sluggishness of the bowels.

The most constant symptoms, consequent upon constipation, are flatulency and colic, which are recognized by certain peculiar cries of the child, by certain movements of its limbs, pointed out in Part II of this work.*

Amongst other children, and chiefly amongst those who are subject to convulsive attacks, constipation very readily brings on convulsions. They are not of serious moment, and cease with the cause which engenders them. Thus we have seen very robust children seized with convulsions, without having presented precursory symptoms. There was no other apparent cause for them but a state of habitual constipation.

When the constipation has lasted for some time, and when no evacuation can be obtained, violent colic, fever, a thickly coated tongue, and vomiting, are sometimes noticed, symptoms which are so often observed, but in a more decided manner, in senile constipation. These symptoms are but rarely observed in young children, and never possess a very great intensity. They have already been pointed out by Underwood, who thus expresses himself: "Constipation is sometimes a predisposing cause of remittent fevers. Of this I have a proof in a child who otherwise enjoyed the best health. During two or three years he was seized at intervals by a fever, which had no other apparent cause than the sluggishness of the bowels, a constipation which it was difficult to overcome by regimen and even by the aid of medicines."

We must endeavour to overcome the constipation by slight laxatives, repeated sufficiently often to keep the bowels free, and sufficiently mild so as not to irritate the intestines too much.

Syrup of roses or of peach flowers, compound syrup of chicory, the syrup of buckthorn, in the dose of ℥j to ℥iss should be given once a week.

* On the Gesture and Attitude.

We may also administer the oil of sweet almonds, ℥ ss to ℥ j; manna, ʒ j to ʒ ij, dissolved in milk; four or five grains of magnesia, with some drops of the tincture of senna; calomel, in the dose of half a grain to one grain. Purgative senna draught, castor oil, ʒ ij to ʒ iv, &c.

When the child appears to have severe colic, it will be sufficient to apply warm applications over the region of the stomach and intestines. Underwood recommends warm camomile flowers placed between two pieces of flannel. This author attributes to this remedy the advantage of easing the pains and of assisting the action of laxatives. Emollient poultices are also very advantageous; their action may be assisted by the administration of small enemata composed of decoction of linseed, without poppies or opium. Narcotics should not be employed in these cases and in this manner. They should be banished; first, because these medicines cannot but increase the constipation; and lastly, because they are highly dangerous. When opium is to be administered to young children it is better to give it internally, some teaspoonfuls, for example, of a ℥ ij draught, to which four or five drops of laudanum are added.

CHAPTER VIII.

ON INTESTINAL WORMS.

Old medical authors have laid great stress on the symptoms to which the presence of worms in the intestinal tube gives rise. They have given so formidable a list of these phenomena that children who had worms were looked upon as seriously compromised. This belief, evidently exaggerated, even now exists in the vulgar mind, and nothing can eradicate it. There is scarcely any disease which they would not more or less connect with the influence of the verminous affection.

The medical world of our time and of our city are more reasonable. They do not incline much to the reality of these symptoms, and without calling in question the assertions of their brethren, they are of opinion that at Paris the verminous affections are rare, and decidedly much less dangerous than has been stated.

Verminous diseases resemble intermittent fevers, they develop themselves in certain localities, and not elsewhere. They there present characteristics which are not elsewhere met with—a fresh analogy with the fenny fevers. Is intermittent fever to be studied at Paris? Neither can one there study the verminous diseases, which are observed in all their intensity in Sweden, Germany, Holland, Switzerland, and in some departments of the west and south of France.

This is the explanation of the vast difference between the opinions of Rudolphi, of Brera, of Bremser,* and the opinions of the greater part of the medical men of Paris. The former have observed them in the localities where the verminous affections are endemic and truly formidable; whilst they are more rare, almost accidental, and of little danger where the latter have established their field of observation.

Three kinds of intestinal worms are met with among children; the ascaris lumbricoides, the ascaris vermicularis, and tænia. This last is rare; the two others, on the contrary, are common enough.

The Ascaris Lumbricoides.

Lumbrici usually develop themselves in the small intestine. Their body is cylindrical, pinkish, gradually diminishing towards the two extremities. On each side a very evident furrow is observed. The head is distinguished by a small circular depression, above which are observed three small tubercles, or small valves, which can open and close; when they open, the aperture of the mouth is perceived in the midst. The inferior aperture presents, a little before its termination, a transverse aperture or anus. The length of the body is from six to eight and even fifteen inches, the breadth about two or three lines. The two sexes are separate; the male is smaller and shorter than the female.

Although lumbrici are usually met with in the small intestine, they are sometimes found in the stomach, œsophagus, and large intestine.

They are common in infants, and especially so in childhood. The use of fruits and vegetables, milk and its preparations, favour their development, which rarely coincides with an animal regimen. They are more frequent in summer and in autumn. Scrofulous children, and those of a lymphatic temperament, are more disposed to them than others.

They are met with in the course of diseases of the alimentary canal, and especially in children attacked with typhoid fever. They are then the consequence of this disease, and they do not give rise to any phenomenon different from the symptoms of the principal disease. It is impossible to suspect their existence, unless several of them have been expelled by stools.

It is a matter of regret that no work on medical geography has appeared to indicate in a precise manner the influence of localities and latitudes on the manifestation of the diseases to which human flesh is heir. Undoubtedly the topography of the verminous affection would there find a place; it would then be truly known what countries are ravaged by this disease. At present the only districts noticed are

* *Traité des vers intestinaux de l'homme, traduit de l'Allemand, avec des notes;* par D. de Blainville. Paris, 1837; in 8; avec atlas.

Holland, Germany, Switzerland, some provinces in the west of France and the departments which surround Montpellier. There this disease presents all those singular and sympathetic phenomena which we have so rarely the opportunity of observing at Paris.

The symptoms of lumbrici are connected with the local irritation which they occasion in the place of their abode and with the irritation which they determine in other organs, the brain for example.

The local symptoms of lumbrici consist of dull or acute colic of more or less frequency, dejection of glairy or sanguinolent matters, vomitings, and lastly, the expulsion of these animals by stool or by vomiting. This last symptom is the only one to which any importance can be attached.

The general symptoms are—loss of appetite, a whitish state of the tongue, sourness of the breath, &c. The face is pale, of a leaden tint, the eyes surrounded by a bluish circle, and the pupils much dilated. There is frequent itching of the nostrils. Sometimes temporary blindness and deafness are observed, partial or general convulsions, delirium, agitation during sleep, and lastly, a continuous pining away. Convulsions are especially pointed out as being the usual consequence of the verminous affection. However, one who has had the greatest experience in diseases of children, M. Guersant, states that he has only met with a single case in which fatal convulsions were occasioned by the simple presence of the ascarides lumbricoïdes. He relates the case, and he adds, that in a considerable number of analogous circumstances, he might have been mistaken, and attributed to worms nervous symptoms, independent of the influence exercised by these animals, and brought on by a central, pulmonary, or gastro-intestinal disease.*

[Dr. Schreber states that great dilatation of the pupils, with bluish rings beneath the eyelids, constitute a common symptom of the presence of intestinal worms. It is a decided fact that largely dilated pupils with bluish areolæ are frequent in fair scrofulous children, and that in them these intestinal parasites are very common, but it does not follow that the former statement should be applied generally and purely to verminous diseases. An interesting case is recorded by Dr. Reicke, in which a little girl, four years of age, suddenly died on the night stool, after having complained of abdominal pain, colic, diarrhœa, &c. On examination of the body, seven balls, formed of intertwisted lumbrici, were found in the jejunum, each ball containing from eight to thirteen worms, the total number being eighty-eight. Two worms were also found in the stomach. The mucous membrane appeared reddened at the spots where the "worm balls" were situated.—P.H.B.]

Once more, and we are glad to repeat it, we are in an unfavourable locality to investigate the symptoms of worms. We do not remark them like our brethren who practice in other localities. Did we not give them the benefit of the reserve imposed by this circumstance, we should feel disposed to accuse their recitals of exaggeration.

* *Dict. de méd.*; p. 244.

Lumbrici, in fact, determine few serious symptoms. Most children pass them, without suffering and without the health being affected. When their number is very considerable, they become the source of more or less serious intestinal lesions. When they exist at the same time as typhoid fever, or any other disease, they in no way alter the progress of the disease, the symptomatic expression of which is the same.

Amongst children who are subject to pass lumbrici, the circumstances which favour the generation of these animals should be carefully avoided. A suitable regimen, a mixed animal and vegetable diet, from which green fruits and the too great quantity of milk are excluded; a prolonged residence in a salubrious situation facing the south, suit these patients.

If symptoms are observed which do not refer to an affection of the alimentary canal or any other organic lesion, and if, moreover, the expulsion of lumbrici has demonstrated their existence, the employment of anthelmintics should be had recourse to. We should first seek to expel the worms, and then to prevent their reproduction.

Worm-seed (Artemisia Santonica) is very much used; it has been much in fashion. It may be given in the following manner:

Powdered valerian	12 to 15 grains.
Worm-seed	12 to 15 grains.
Calomel	2 grains.
White sugar	30 grains.

Mix, and divide into four powders—one to be taken every twenty-four hours.

This substance has been sometimes associated with Corsican moss:

Worm-seed	12 grains.
Corsican moss	12 grains.
Sugar, powdered	15 grains.

Divide in four powders—one to be taken twice a day in preserves.

The following is the formula of a syrup which M. Cruveilhier praises very much. After its use children have passed sixty lumbrici in one morning:

Senna leaves, rhubarb, worm-seed, sothern wood (Artemisia Abrotamun), Corsican moss, tansy flowers, small absinth—of each sixty grains.

Infuse in the cold in ℥ ix of water; strain and add sufficient sugar to form a syrup; a spoonful to be taken every morning for three days.

Camphor has been advantageously used by Rosen, who gave it in a draught, to which a small quantity of generous wine was added.

The decoction of garlic, fern, assafœtida, the oil of Dippel, of Chabert, &c., have been also recommended; but these medicines are little used on account of their very disagreeable taste.

It is proper to combine with the employment of these means which kill the worms, the action of purgatives which expel them.

Thus a short time after having given the anthelmintic remedy, eight or twelve hours afterwards, castor oil, jalap powder, or still better, calomel should be administered.

Most physicians also recommend the use of tonics in order to effect a slight change in the constitution of the children. The antiscorbutic syrup or the syrup of bark, ℥ ss to ℥ j a day; and it is to conduce to the same result that cod-liver oil is also given, in the dose of ℥ ss to ℥ j, mixed with an equal quantity of simple syrup.

[MM. Beauclair and Viginer (*Med. Gazette;* No. 30), in the course of a paper having for its object to demonstrate that the production of worms must be regarded as a diathesis, and that in treating those suffering from the disease, we must aim at the correction of the vitiation of the humours, testify to the great benefit they have derived from the administration of cod-liver oil. They recommend the following formula: five drachms of the oil are to be mixed with six of powdered sugar, fifteen grains of bicarbonate of soda, six drops of essence of mint, and one drop of the essence of bitter almonds. This is to be given fasting, divided into two doses. In the case of adults, the entire quantity is to be given, substituting carbonate of potash for soda. They at the same time recommend tepid alkaline baths for half or three-quarters of an hour, and when the functions of the skin are slow in reëstablishing themselves, warm air baths, or baths giving off ammoniacal fumes, are useful. Good diet and all hygienic means calculated to fortify the cutaneous, respiratory, and digestive functions, are also indicated.—P.H.B.]

On the Ascaris Vermicularis.

This ascaris is of a filiform shape, one line and a half in length; the head obtuse, the tail terminating in a very slender extremity; its seat is nearly always in the large intestine and especially the rectum. In little girls it sometimes occupies the genital parts.

These worms occasion very severe itchings and sometimes considerable pains. The child incessantly carries the hand to the painful parts and scratches furiously. It is a serious inconvenience when the ascarides occupy the vulva. They cause a more or less decided vaginal discharge. The habit of masturbation has sometimes no other origin.

These worms are difficult to get rid of; they multiply with an astonishing rapidity. In order to destroy them, the following means must be employed:

Enemata should be administered composed of:

1st. The decoction of two cloves of garlic in milk.

2nd. The decoction of about ℥ viij of soot in ℥ iv of water.

3rd. Calomel in suspension; five grains in yolk of egg.

4th. Three to four scruples of mercurial ointment mixed up with oil or melted butter.

5th. The solution of the arsenite of soda, which I have seen employed at the Necker Hospital by M. Trousseau:

Arsenite of soda	1 grain.
Distilled water	℥ xij.

For six enemata—one or two a day.

This remedy often occasions rather violent colic.

6th. An enema of simple cold water, as recommended by Van Swieten.

7th. The enema of absinth, two to four drachms in infusion, &c.

Without there is a special indication, it is not necessary in this disease to administer medicines internally.

On Tænia.

Tænia is observed in children with the same characters as those which it presents in the adult. The symptoms are the same; but these are not to be depended upon. The expulsion of the fragments of the worm establishes the diagnosis. In the treatment, the same agents which are used in the adult should be administered. It is therefore useless to specify them here.

CHAPTER IX.

ON THE INVAGINATION OF THE INTESTINES.

Intestinal invagination also bears the names of intussception, volvulus, and ileus. It is characterized by the spontaneous introduction of a part of the intestine into the continuous adjacent and inferior portion. It is a penetration similar to that which is produced when a finger of a glove is drawn back on itself.

This lesion is very frequently observed in the newly-born and in children at the breast. Hévin relates, in his memoir on gastrotomy, that he has seen more than three hundred examples of it at the Salpêtrière, in children who have died during teething or in consequence of verminous affections. In these cases invagination takes place during the extreme pain, under the influence of the peristaltic movements of the intestine, and does not give rise to symptoms sufficient to ensure its diagnosis.

In other cases, the invagination occurs almost suddenly in a child attacked with diarrhœa or acute enteritis, and of this there is already a tolerably large number of cases reported. I would here refer to those of Monro, Cayol, Billard, Gorham, Mitchell, Clarke, Cunningham, Markwick, Marage, Rilliet, &c., which are highly interesting to consult.

In children the invagination presents itself with anatomical characters similar to those which are observed in the adult, the symptoms alone

are modified. The diagnosis is uncertain and difficult. The treatment is powerless.

There is usually but one intestinal invagination in the same child. When several of them exist, as in the cases of Louis, they are formed at the moment of death. It is always the superior extremity which introduces itself into the inferior, the jejunum into the ileum, the ileum into the cœcum, the colon into the rectum, and the extent of this differs, varying from three to six, twelve, and eighteen inches.

M. Rilliet states in a recent treatise, that in infancy the intestinal invagination is always accomplished at the expense of the large intestine, and that there is never invagination of the small intestine. This is incorrect. I have observed the small intestine invaginated in the adjacent inferior part. Taylor has reported a case of this kind in a child twenty months old, who died after an attack of acute peritonitis. M. Marage has seen another case in a child thirteen months old, who recovered after having voided the invaginated portion, furnished with two of those diverticula, so frequent in the small intestine of the fœtus.

Intestinal invagination may then take place in the jejunum and ileum. It is more frequently observed in the cœcum, colon, and rectum.

The invaginated part usually adheres to the invaginating portion; it is compressed, contracted, red and swollen at the point of stricture, so much so that the calibre of the intestine is sometimes obliterated. The congestion of blood may be here very considerable. It is also sometimes the seat of an acute inflammation, and even of *gangrene*, if the patient has some time survived the derangements occasioned by this lesion.

Thus, Dr. Markwick has observed invagination of the large intestine in a child four months old, who had presented the symptoms of acute enteritis, with considerable intestinal hæmorrhage; the nature of the stools changed at the termination of the disease; the flow of blood was replaced by a blackish liquid matter of a gangrenous odour, and on the dead body gangrene of the invaginated portion of intestine was observed.

The end of the intestine preceding the invaginated portion can present nothing peculiar. It is sometimes distended by gas.

The knuckle of the intestine which succeeds the invaginated portion preserves its natural dimensions, and its interior is sometimes coated with blood and membranous detritus.

The mucous membrane of the intestine is usually the seat of a very decided inflammation, with capillary injection, softening, and minute ulcerations; the same is the case with the peritoneum, when recent adhesions, flakes of fibrine, and more or less abundant plastic serosity are observed.

[The process of the formation of intussusception was ocularly observed by Dr. Eichstedt (*Uberden Durchfall der Kinder;* p. 38) in a rabbit. A portion of the small intestine contracted itself quite closely, and continued some time in this state; the upper part of the bowel then commenced strong peristaltic action, and soon afterwards the part beneath and contiguous to the contracted portion assumed an antiperistaltic movement. As the peristaltic was stronger than the antiperistaltic motion, the contracted portion became pushed into the part moving antiperistaltically. He witnessed five such intussusceptions, in all the process being the same; after some time they became loosened. In one the contracted portion was pushed a full inch deep into the under bowel.—P.H.B.]

The intestinal invagination is characterized by serious, varied, and complex symptoms, which are sometimes obscure, sometimes, on the contrary, very significant. They are more or less decided, according to the degree of the obstacle presented to the course of the fœcal matters by the invagination. In the case of absolute stoppage, the symptoms closely resemble those produced by hernia; when the obstacle is incomplete, the symptoms, on the contrary, much resemble those of acute enteritis.

The invagination is always the cause of violent colic, which the agitation, movements, and cries of the children betray. Then the belly swells, becomes hard and painful, and there is sometimes remarked, as Dr. Clarke points out, an elongated tumour, formed by the invaginated portion of the intestine.

The children are sometimes constipated. They more frequently have diarrhœa, and even a very abundant serous and bilious diarrhœa. The fœces are almost always mixed with striæ of red blood, and are sometimes composed of pure blood, but this is more rare. The presence of this intestinal hæmorrhage is of the highest importance in the diagnosis.

[Mr. Gorham, in a paper on this subject, lays stress on the following diagnostic sign: "the passing of blood *per anum* in various degrees of purity, never, indeed, contaminated with feculent matter, but chiefly with mucus"—to which may be added constipation, vomiting, and constant straining as if a motion was to pass, nothing, however, but blood being seen, from a few drops in some cases to hæmorrhage in others. Of two cases which came under the notice of Dr. Willshire (*British and Foreign Med. Chir. Review;* xi), one was in a male child of eleven months, suffering from entero-colitis. No food was taken for several days before death; there was constipation, much vomiting, and frequent straining, with the passage of a little blood. The other was also a boy, aged four months; he was seen two days before death, and described as having had no fœcal evacuation for five days, but vomiting and straining, the latter frequently accompanied by small bloody and slimy discharges. The abdomen became tympanitic and tender, and the child fell rapidly into a state of collapse. Intussusception was diagnosed here as in the other case. In both the necropsies substantiated the diagnosis, as well as that of peritonitis in the latter. In both of these cases, and in another, that of a young lady in whom it was assumed, from the symptoms only, that invagination had occurred, the plan of injecting large quantities of fluid was tried; in neither was it of any

avail, but, on the contrary, seemed to be a source of much trouble, if not pain, to the patients.

The following is an interesting report of a case of intussusception, with sloughing of the invaginated portion of the intestine, and its expulsion per anum, followed by subsequent gangrene of the leg below the knee, and recovery. A little boy, six years old, with fair hair and complexion, and of previous good health, was attacked without obvious cause, on the 27th of October, 1852, with swelling and discoloration of the calves of both legs; they were mottled in appearance, painful, and cold to the touch. The next day these local symptoms had subsided, but severe and nearly constant vomiting came on; this was accompanied by constipation, with much pain and tenderness in the abdomen, especially in the right iliac region. All the usual means likely to relieve such symptoms were adopted, and injections administered per anum, but without any beneficial effect, a little hardened feculent matter only being brought away by the enema. The patient continued much in the same state for four days, viz., until the 2nd of November, when the vomiting ceased and severe general convulsions and insensibility supervened. He lay for twelve hours perfectly unconscious, with a widely dilated pupil, unacted on by light, a quick thready pulse, cold, clammy perspirations, and a mucous rattle in the chest. Under the influence of the most powerful stimuli he rallied. A blister was applied to the nape of the neck, and one grain doses of calomel administered every four hours. Beef tea was also ordered to be taken *ad libitum*. Convulsions continued at intervals during twenty-four hours, viz., till the night of the 3rd, when he slept pretty well, and on the 4th seemed, on the whole, in a better condition. Complete consciousness had returned, but pain was still complained of in the right iliac region, and the whole abdomen was slightly distended and tympanitic. The constipation continued complete, and an injection which was this day administered returned offensive and mixed with dark blood. Calomel was still given, but in half grain doses.

During the next four days no material change occurred; no motions were passed from the bowels; no injections were administered, but fluid nourishment was freely given.

On the 7th of November, the mucous membrane of the mouth was observed to be slightly ulcerated, but the breath had no unpleasant odour, nor were the gums swollen. The mercury was, however, discontinued. Not any active or urgent symptoms were now present, but the patient was of course much debilitated. On this evening (7th), being eleven days after the commencement of the symptoms, five days after the vomiting had stopped, and four days after the cessation of the convulsions, he passed *per anum*, the cœcum, with its verniform process, and part of the ascending colon. The mass was passed without the patient's knowledge and during sleep. The next morning he had a natural and solid motion, and seemed improving in condition. On the 9th the leg was observed to have become cold, and on examination it was found that the arterial pulsation in the groin and below that point had ceased; spontaneous separation occurred in December, and by judicious management a tolerable stump was formed at the knee joint.—*Lancet*, June 17th, 1854—where a drawing of the portion of intestine passed per anum is given.

Of thirty males and twenty-nine females who died of intussusception in London in 1849, twelve males and thirteen females died under five years of age.—P.H.B.]

The children vomit, especially rejecting their drinks, or glairy, yellowish matters; or stercoraceous matters, as Cunningham has observed.

The countenance soon changes, becomes pallid and cold. The features sometimes recal the expression of the face of cholera patients. The strength rapidly declines, and prostration seizes the patients; their

pulse becomes feeble, and disappears; then syncope comes on, and, finally, death at the end of three or four days.

Amongst other children the disease lasts a much longer time, but the vomitings gradually cease, the intestinal hæmorrhage disappears, the strength returns, and the health becomes restored again, without the expulsion of fragments of the intestine. M. Rilliet, who points out this possibility of the cure of intestinal invaginations, observes that it always takes place in this manner. It is true that it is often thus, but however, in a case which has been reported by M. Marage, and which can be evidently traced to an old intestinal invagination, the child voided a portion of intestine and two membranous diverticula, the drawing of which has been published in the *Union Medicale*.

The above is a short detail of the symptoms of intestinal invagination; the accuracy of which may be verified by the perusal of the following cases.

Case. Invagination of the intestines; peritonitis; death. A child, seven months old, was admitted into the Necker Hospital with its mother, who was labouring under an abscess of the womb.

Some time after, the child, which was strong and in good health, had a slight diarrhœa, then on a sudden began to cry continuously and to writhe in his mother's arms. The belly was painful on pressure, then it became hard and swollen. The child ceased to pass stools. Soon afterwards, there were frequent vomitings of glairy matters and yellowish liquids.—Calomel, gr. iss.

On the second day, no stools, almost incessant vomiting; the belly is hard, distended, and painful; the face is pale and sunken, the eyes surrounded with a livid areola, as in a case of rapidly fatal enteritis; the extremities cold, and the pulse scarcely perceptible.

The calomel to be continued; and cataplasms with laudanum to be applied on the belly.

The calomel produces no effect, and enemata return just as they were administered.

On the third day, the condition is the same. It is impossible to touch the belly; death took place in the course of the day.

On the *post mortem* examination, some false membranes were observed in the peritoneum, around a portion of invaginated intestine, and in the peritoneal cavity a spoonful of limpid serosity, holding a lengthened false membrane in suspension. The peritoneum was injected in various points at the situation of some intestinal folds adhering to each other. These adhesions were slight and few in number. At about four inches from the cœcum an invagination of the colon existed about two inches in extent. This intestine was very much distended above this obstacle. Below it presented its natural calibre. The invaginated portion was firmly fixed at the inferior extremity by adhesions. It was red, livid, swollen, softened. The calibre of the intestine was not completely obliterated, and would admit an ordinary sized blunt probe. The mucous membrane of the ileum was the seat of a rather considerable injection as far as the duodenum; it was not softened, and a yellowish mucus covered it in a great part of its extent. The cœcum did not present any thing particular.

Case. Invagination of the intestines; enteritis; death. A very fine child, six months old, after a slight stool, was seized with symptoms of hernia; cried, gave symptoms of extreme suffering, vomited and is constipated, the cries coming on by paroxysms.

At the examination, Mr. Cunningham discovers a deeply seated tumour in the left iliac region ; he diagnoses an intestinal invagination, and prescribes, 1st, an oleaginous enema ; 2nd, a tepid bath prolonged even to syncope ; 3rd, three leeches on the tumour.

The symptoms are continuous ; the vomitings have become *stercoraceous ;* the child has passed blood by the rectum, and on the third day it died.

On the *post mortem* examination, the cœcum and ileum were observed invaginated in the rectum to the extent of nearly two and a half inches. The invaginated portion was black. The rest of the intestinal canal was inflamed and distended by fœcal matter and gas.—*The London Medical Gazette, and Gazette Médicale.* 1838.

Case. Invagination of the intestines ; death. A child, eleven months and three weeks old, is seized on the 13th February, 1828, between nine and ten o'clock in the morning, by violent agitation, uttering loud cries for three or four hours. In the afternoon the gums are scarified, and powders of calomel and antimony administered.

Mr. Clarke was called in the next day. He finds that the child has passed a very disturbed night, and that there had been no alvine evacuation. On the examination of the napkins blood is observed, and the mother states that much of it has been passed all night long, by the rectum ; so that it was necessary to change it five or six times. The physiognomy of the child is exceedingly expressive of depression, as if it had the cholera. Pulse quick and feeble, pallor, agitation ; the child writhes under the pains it experiences ; the abdomen is neither distended nor painful, or at least is but slightly so on palpation. Immediately after having sucked, it vomits ; the skin is cold. Mr. Clarke does not know at first to what the symptoms are to be attributed ; as, however, he learnt that there was a suspicion that a cake had been given to the child, three grains of calomel were prescribed, to be repeated if no stool resulted, and a draught composed of rhubarb and liquorice water. The calomel is rejected with the milk of the mother. An enema of castor oil is administered which appears to give him relief ; but the child only evacuates blood and mucus. Warm flannels to the feet and on the abdomen. The next day, 15th, the symptoms are aggravated ; vomitings more decided, agitation more intense, pulse thready, the abdomen a little distended, the muco-sanguinolent discharge continues, the urine passes freely.

Mr. Streeter was called in consultation. He suspects an intussusception, but he gives a preference to the idea of an intestinal hæmorrhage ; he prescribes turpentine enemata, a light nourishment of arrow-root and a little wine, and if the feebleness increases, some drops of ether. The child, however, can take nothing, and died in a state of emaciation the night of the 15th, seventy hours after the attack.

Autopsy thirty-six hours after death. A slight effusion of sero-sanguinolent fluid was observed in the peritoneum. The intestines are all glued together, applied to the spine of the left side, the appearances most decided, on the descending colon. On examination it is discovered that this intestine encloses another in its interior. The intussusception commences about four inches from the end of the ileum in the cœcum. The invaginated portion had passed in the descending colon conjointly with the cœcum and through all the ascending transverse and descending colon to the sigmoid flexure. No inflammation existed ; the invaginated intestine is black and covered with mucus ; the remainder of the canal contains a liquid matter ; the stomach is dilated and presents a good example of the softening, destructive, and perforating action of the gastric juices. The pulmonary organs are healthy. The brain was not examined. The pathological specimen was presented to the Medical Society of Westminster.—*Lancet, and Gazette Médicale.* 1838.

In these very curious cases in which we observe the disease marked

by a very formidable set of symptoms, there is, however, one striking circumstance; this is the uncertainty of the signification of the symptoms. They belong for the most part to peritonitis and to enteritis as well as to intestinal invagination; and in the first case which I have reported, the misconception was complete. I referred the symptoms to peritonitis, which really, in fact, existed, but which was consecutive to the invagination discovered in the body, and not diagnosed during life. It will be always very difficult to form a diagnosis of intestinal invagination, and *with the exception of the tumour in the belly or prolapsus by the rectum*, the positive diagnosis is impossible. In a like case, the diagnosis can only be conjectural. The intestinal hæmorrhage should be especially taken into consideration, which, without being characteristic of the invaginations, may still lead to the suspicion of their existence.

The prognosis of invagination of the intestines in young children is extremely serious; from the time that the lesion presents an obstacle to the course of the fœces, it rapidly becomes fatal. In the adult, there are many cases which recover, but most of infants attacked with it, die.

Notwithstanding the unfavourable prognosis above given, we must not merely look on and do nothing against the invagination. We should endeavour, 1st, to reëstablish the course of the excrementitious matters; 2nd, to moderate the inflammation of the intestine and of the peritoneum.

We should first prescribe for the children slight purgatives, of a strength proportionate to their age; calomel in the dose of from one to three grains, oil of sweet almonds in the dose of ℥ ss to ℥ j. Then oleaginous enemata with ℥ ss of castor oil, or purgative enemata with ℥ iiss of chloride of sodium.

Mr. Mitchell states that he has once succeeded by introducing a very flexible gum elastic tube as high as possible into the rectum, through which he blew in air, by means of a pair of bellows. The distention of the intestine which resulted caused the disappearance of the presumed volvulus and the symptoms of strangulation, and after several alvine evacuations all went on well.

A similar method has succeeded in the adult in the hands of Dr. Bennati; this consists in the injection of a large quantity of tepid water into the rectum and into the intestine by means of a large forcing suction pump, in a continuous stream. These means should be made use of.

In the case where phenomena of previous or consecutive inflammation of the intestine exist, they should be treated by slight abstractions of blood from the abdomen, baths, simple and opiated cataplasms, emollient and mucilaginous drinks; lastly, by slight narcotics internally.

CHAPTER X.

ON INTESTINAL HÆMORRHAGE.

The hæmorrhages of the alimentary canal are rather rare in the first period of the life of children. They are more frequent in the newly-born than during the months which follow birth. They are the result of evident causes of a special nature, easy to detect and to group, so as to make them the object of important nosographical divisions.

Causes.

Some of these hæmorrhages depend upon a peculiar state of the economy, a general serious state to which Verlhoff has attached his name, which is generally known under the denomination of *purpura hæmorrhagica*, and which is the consequence of a considerable change in the blood.

Others, and these are the most frequent, are only observed during the first fifteen or twenty days of life, and are referred by the best observers to a sort of passive congestion, the result of the compression of the fœtus during the time of the accouchement.

Lastly, others are the result of the invagination, or of the acute or chronic inflammation of the intestine. The cases which I here relate are the first with which I am acquainted, and which demonstrate the influence of this last cause in the production of hæmorrhage amongst children also little advanced in age.

First variety. The hæmatemesis and melæna which sometimes accompany *purpura hæmorrhagica* have been remarked by M. Richard in a child two years old, affected with this disease.

The same observer has also met with melæna in a child born only some hours. This child passed black blood with the meconium. It appeared that she continued to void blood thus by the stools, once or twice a day, during twenty days; then the flow diminished a little without being completely arrested, so that the child, very much debilitated, died exsanguine at the end of seven weeks.

She had a prolapsus of the rectum, like her eldest sister, nine years old, and numerous spots of purpura on the legs, indicated the nature of the disease.

Billard has met with two cases of it, one of which in particular is very interesting.

Delarue, of the female sex, was placed alive in the crib of the Enfants Trouvés on the 27th of March, 1826. A notice fastened to the arm stated that she was born three days since; she was strong and of full size, the complexion slightly jaundiced, the respiration little developed, the cry scarcely to be heard; the lower limbs were œdematous. The face, trunk, limbs, and arms were covered with violet petechiæ of various sizes. Their diameter varied from that of a very small speck to the size of a bean. The unequal manner in which they were scattered, the yellowish intervals which the cutaneous surface presented between them, gave to the body a tiger like aspect. She remained two days in this state of inanition, drinking several drops of milk, scarcely ever crying, and breathing but little. She died on the evening of the 29th of March. The *post mortem* examination was made the next day.

Digestive apparatus. The stomach was filled with a rather large quantity of viscous and black blood; its internal surface, as well as that of the jejunum, were sprinkled with numerous petechiæ, similar to those on the exterior of the body. Effusions of blood were observed in the interior of the intestinal tube, scattered here and there, and the mucous membrane presented, in the points corresponding to these effusions, petechial ecchymoses similar to those of the stomach; *the termination of the ilium contained a much blacker and much more diffluent blood;* the large intestine was the seat of a very decided follicular eruption; *it contained at its termination a considerable quantity of blood;* its wall was thick and firm.

The spleen, of very large size, was very much gorged with blood; it presented, near the insertion of the short vessels, an oblong and superficial rupture, to the surface of which a rather solid clot of blood adhered. There was found on the abdominal cavity a large spoonful of blood, the effusion of which was probably the result of the rupture of the spleen.

The heart was very large and gorged with blood; there was an effusion of yellowish serum between the proper substance of the organ and the serous layer which invests it; its surface is sprinkled with petechiæ, and they are also observed on the surface of the pleuræ. The fœtal openings are still free, the lungs are engorged, the kidneys and the bladder also present numerous ecchymoses. The brain is the seat of a very considerable congestion.

The cellular tissue of the limbs and of the abdominal integuments present large ecchymoses; the blood which forms them is infiltrated and coagulated in the meshes of this tissue.—Billard, *Traité des maladies des enfants;* p. 106.

M. Gubler, one of my friends, has sent me a case similar to the one just reported. The subject of it was a boy, one month old, who had successively sclerema, discrete variola, and purpura hæmorrhagica; he died of pneumonia. In the midst of these diseases he vomited a clot of black blood, and his linen was stained by a brownish matter, similar to dried blood. In some parts it was easy to collect the crust, and it could be dissolved in water which assumed a reddish tint. In other places, the linen was soiled by blood voided in a liquid state. The whole of the body was covered with spots of purpura, which very clearly indicated the cause of the hæmorrhage. The blood exuded into the intestine, sweated through these vessels under the influence of the same unknown force which had determined the hæmorrhage of the cellular and of the cutaneous tissue.

Second variety. The possibility of intestinal hæmorrhages at the

time even, or very soon after, birth, has been already pointed out by Fr. Hoffman, Brebis[1] and Lafaurie,[2] and has been the subject of more recent researches by Billard,[3] MM. Gendrin,[4] Rahn-Escher,[5] Kinwisch,[6] Barrier,[7] Rilliet,[8] &c.

Billard has remarked twenty-five cases of passive congestion of the intestinal tube, without hæmorrhage, amongst children who have died some hours or some days after birth. In this state no symptoms connected with the digestive tube have been observed. Fifteen of these children had all the external characteristics of the apoplectic condition of the newly-born, and had only presented symptoms of congestion of the lungs and of the heart.

He has only noticed passive intestinal hæmorrhage as a consequence of this congestion in fifteen subjects; eight of these children were from one to six days old; four from six to eight days, and three from ten to eighteen days. Of this number six were boys and nine girls. The greatest number were remarkable for the plethoric state of the tissues and for the general congestion of the integuments. Some, on the contrary, were pale and feeble as in the case after a copious hæmorrhage. In all, the large vessels, the liver, spleen, lungs, and heart were considerably engorged with blood; in nine, the fœtal openings were obliterated or on the point of being so; in all the rest they were yet free. In the brain and spinal cord of all, there was a very decided injection of the meninges and of the cerebral pulp. Lastly, in all, the intestinal tube contained blood which was observed to be more or less changed, pale red, dark red, blackish, exuded in a thin layer upon the mucous membrane, or accumulated in specks or in clots in different parts of the digestive tube.

Billard very justly refers these bloody evacuations to the state of normal congestion of the intestine of the newly-born, when by chance this state is aggravated by an obstacle to the establishment of the circulation, such as the apoplectic state, the increased size of the liver, spleen, &c. Billard, however, appears to be in error, in considering these hæmorrhages as a very serious symptom, almost necessarily followed by death. This is not always the case. M. Rahn-Escher has published several cases of cure; in one which is especially interesting, there were at the same time abundant vomitings and dejections of blood in a child which at the fourteenth day was completely recovered. As to the facts published by M. Rilliet, their importance has compelled me

1. *De vomitu et secessu cruento, etc.* (*Act. nat. curios.*; vol. iv, 1837.)
2. *Annales de la Société de Montpellier.*
3. *Mal. des enfants.*
4. *Traité de médicine pratique.*
5. *Observations sur l'hémorrhagie des premières voies.* (*Gazette médicale*, 1835.)
6. *Apoplexie abdominale des nouveaux-nés.* (*Gazette médicale*, 1841.)
7. *Traité du mal de l'enfance.*
8. *Gazette médicale.* 1848, p. 1029.

to reproduce them, and in them many peculiarities worthy of fixing the attention will be observed. M. Rilliet has only once observed intestinal hæmorrhage in the newly-born, and in this case it was in twins who had been very ill, and both of whom perfectly recovered.

The following are the cases related by the author himself:

Case 1. On the 30th of January, 1846, I was called, at one p.m., to see a newly-born child which they informed me was in the greatest possible danger. I collected the following history from the nurse, which was afterwards confirmed by Dr. Maunoir:

The little boy, born at four o'clock in the morning, was one of twins. The labour was not a very difficult one; *however, M. Maunoir thought proper to apply the forceps.* The placentæ were separate, the liq.-amnii not very abundant. The cord presented nothing remarkable; it was tied in the usual time and manner. The child was of full time, not very large, but well formed, lively, crying loudly, and not plethoric.

All the functions appeared to be in their natural state. The meconium was expelled some hours after the accouchement, in consequence of the administration of half a teaspoonful of castor oil. The child had then had some sleep, and had afterwards taken the breast with avidity; in a word, nothing could lead to the suspicion of anything wrong, when the nurse perceived, in changing the linen, that the remainder of the meconium was mixed with a certain quantity of blood. Two hours afterwards, the child passed a copious stool of pure blood, liquid and mixed with clots; at one o'clock in the afternoon, a third stool of blood, of bright colour: it was then that I was called.

When I examined the little patient I found it in a deadly pallor. The nurse told me it had *wonderfully changed.* The pulse was imperceptible, the limbs and arms cold; the eyes were habitually closed, as well as the mouth. It could not, nor did it wish to swallow anything; the power of motion was, however, preserved as well as the cry. The belly was tolerably supple, not swollen; pressure did not appear painful; there was neither vomiting nor defæcation. The examination of the mouth, after the forcible depression of the lower jaw, did not present any lesion; there were no nervous symptoms. Compresses moistened in cold vinegar were applied on the abdomen, whilst the extremities were enveloped in warm flannels; two enemata with a solution of twelve grains of the extract of rhatany were prescribed. They were nearly immediately returned, accompanied by a considerable quantity of blood.

At four o'clock in the afternoon, the child was in the same state; I saw it with Dr. Maunoir, and we prescribed applications to the abdomen of compresses steeped in a strong decoction of rhatany (two ounces to the pint), and enemata with twelve grains of the extract. Like the preceding, they were almost immediately returned and followed by an abundant flow of liquid and coagulated blood. The sixth sanguineous stool was passed at six o'clock in the evening; the application of compresses was all that was then persisted in. The pulse was of little more power, 120; the child had a slight trembling of the hands and an oscillation of the globes of the eyes, but no convulsions, properly so called. The abdomen was not swollen.

From ten o'clock in the evening to the morning of the 31st, eight or ten spoonfuls of cold milk were given it, which remained. At eight o'clock in the morning, it was put to the breast; it easily seized the nipple, at several distinct times; the pulse was regular and easily felt. At noon it passed two slight stools—

greenish, digested, containing neither blood nor caseum. At one p.m. the countenance was good, not very pale, the pulse easily perceptible, 104; it sucked readily and with avidity. The tremor of the arms and the oscillation of the eyes had disappeared, but there was considerable emaciation and the flesh was very flabby.

On the 8th of February, at eight o'clock in the morning, it passed two yellowish stools; during the night it sucked at several distinct times for two or three minutes. The pulse was small, but the cries were energetic and the movements active. The figure was shrunken and had the yellow tint characteristic of hæmorrhage. The abdomen did not present any symptoms except a dulness, three fingers breadth in the left hypochondium, without the spleen being perceived to extend beyond the ribs.

From this date the cure might be considered as certain, and in fact it was continuous. The child rapidly recovered, the digestive functions were executed in a natural manner; but the pallor remained for a considerable time. At the age of six weeks it was vaccinated, and the skin, although scarcely scratched with the lancet, furnished a considerable quantity of blood. It is now in the most flourishing state of health.

No appreciable cause, whether external or internal, hereditary or acquired, antecedent, concomitant, or posterior to the delivery could account for the invasion of the disease.

Case 2. The first child was still in an alarming state, when at six o'clock in the evening, they called me in great haste to see the second, who vomited blood, and, immediately afterwards, passed several stools of liquid blood, mixed with clots of the colour of raisins, deluging the linen, and in quantity as much as the two hands would contain. I ordered enemata of rhatany to be administered, but they brought away, as in the case of the brother, abundant sanguineous stools. I then merely applied compresses dipped in a cold decoction of rhatany to the abdomen, and enveloped the extremities in flannels moistened with a warm aromatic infusion.

The same general symptoms were observed as in the preceding case: pallor, chilliness, smallness of pulse; tremor of the trunk and limbs; oscillation of the eyes; no swelling of the abdomen. The sanguineous evacuations occurred in the night, but in diminished quantity. They were still present on the 31st, at eleven o'clock in the morning; they are in slight quantity, and are composed of a mixture of blood and meconium. At one p.m. it was worse than its brother; the pulse was at less force, 112; the drowsiness more marked; it sucked much less (it was only in the morning that it commenced to swallow some spoonfuls of milk). It was very much emaciated.

February 1. Nine o'clock in the morning. From yesterday, at one p.m., two more small stools of blood, the last between five and six o'clock in the morning. It has not yet passed normal stools; it has taken the breast several distinct times and with vigour, and this morning in particular, in my presence. The pulse beats 120; warmth is present all over the body; nothing particular in the other functions. During the day it commenced passing yellow stools which continued the next day; it often seizes the breast, and with avidity.

February 2. Pulse 104. The little patient has already put on an improved appearance; the face is less emaciated; considerable warmth.

The recovery was as rapid and as complete as that of its brother.

This double case is unique in science. It forcibly leads the mind back to the philosophical ideas of an epoch in medicine which no

longer exists. It recals to us that there was a time when the powers of the organism were considered as presiding over the disturbances of its substance, and that in this case the hæmorrhage of each of these twins would have undoubtedly have been attributed to the same disturbance, on the principle of their similar development, so physically appreciable. This case would have been ranged, as M. Rilliet himself would do, amongst those in which, still amongst twins, it is said that the disease developed on the one is observed equally to appear on the other. However, whatever may be the opinion of M. Rilliet, and without wishing to object to his philosophy, there is another manner in which this phenomenon can be accounted for, a little more simple but equally plausible. This is the one I adopt. I believe that in this case of double pregnancy, terminated by a rather tedious delivery, *by means of the forceps*, a reciprocal obstacle to the circulation of both these children occurred in the interior of the uterus, a general pressure, and prolonged at the time of the traction by the forceps, circumstances precisely similar to those already known, in which, as M. Billard has pointed out, passive congestion of the intestine takes place, and the transudation of blood in the interior of this viscus.

Third variety. Besides the entirely special cases which have been just pointed out, and which explain the nature of certain intestinal hæmorrhages amongst young children, there are others at present imperfectly understood, which may conduce to the same result. Although they have not yet been observed in early life, their influence at a more advanced period of existence is not the less very positive. Thus, it is known that typhoid ulcerations, tubercular ulcerations, the anatomical lesions of enteritis, or the perforation of a small artery by a lumbricus, may occasion intestinal hæmorrhage, but, I repeat it, the intervention of these various causes has never been met with in very young children. I have had the opportunity of studying this influence in what relates to acute and chronic inflammation of the intestine, and I provisionally range these facts in a particular category, until other analogous facts may decide its existence in a definitive manner.

My first case presents for consideration—

1st. The fact of an abundant intestinal hæmorrhage, of a flow of liquid blood, in a child four months old.

2nd. The presence of an acute inflammation of the intestine as a cause of this hæmorrhage.

3rd. The fact of black vomitings at an age in which it is so rare to observe them.

4th. Lastly, the cure of the disease, under circumstances which scarcely allowed me to hope for this happy result.

The following is a detailed history of the case:

It was observed in a girl four months old, plump, fresh, and well developed, suckled by her mother, who believed herself pregnant, and who attributed to unknown modifications of her milk the symptoms experienced by the child.

This little girl continued to suck, when suddenly she appeared restless, uneasy, and was seized with green diarrhœa mixed with yellowish specks.

After two days' indisposition the child passed a little pure blood by the rectum. Very frequent stools stained the napkins each time, to an approximative extent of two square inches. Opaline mucosities were sometimes mixed with this blood.

The abdomen, nearly indolent, was tumefied, the tongue white with reddish spots, there were no vomitings; there was hardly any febrile reaction, and the external aspect of the child did not indicate a serious morbid state.

Rice water with gum, cold applications on the abdomen, and nearly cold starch enemata were prescribed.

The following day slightly abundant vomitings of black matters, similar to mould suspended in glaring mucosities, were thrice repeated.

On the fifth day the face was shrivelled, features changed, skin dull, tarnished, yellowish, eyes deeply excavated and moving about in an undecided manner; lips dry, covered with a brownish harsh film; mouth gaping, tongue white, a little dry, skin chilly, adherent to the tense cellular tissue, and the body in the most complete state of weakness.

The black vomitings have continued, and in place of pure blood, blackish matters escaped from the anus.

The cold enemata were persevered in and a blister applied to the epigastrium.

On the sixth day general convulsions appeared as a complication of this condition, already so serious. The face, limbs, and trunk were agitated with convulsive movements intermingled with sharp cries. These convulsions were especially apparent in the eyes, fingers, and toes.

The respiration was irregular, nearly insensible, and occasionally mingled with an extensive, deep inspiration, complementary to the preceding inspirations. The pulse was 120.

Vomitings and alvine evacuations, composed of blackish matters, had already taken place.

A second blister was applied above the first. The cold applications to the abdomen and the cold enemata were persevered in.

On the eighth day the convulsions had ceased, as well as the evacuations of blackish matters. No more vomitings. Diarrhœa of yellowish matters.

The face assumes a more favourable aspect, the eyes appeared to follow exterior objects again. The warmth of the skin returned, which in the limbs it was less hard to the touch; the pulse was 112 a minute.

The following days the improvement continued, the diarrhœa disappeared, and on the twelfth day the recovery appeared to me to be sufficiently certain to warrant the use of food. Pure water was first given, then mixed with milk, at the same time making use of the starch enemata and the emollient applications on the abdomen. The child recovered.

To recapitulate, then: it was after a diarrhœa of two days, accompanied with colics, that the hæmorrhage manifested itself.

During forty-eight hours, pure blood issued from the intestine. At the end of this time the hæmorrhage was arrested. The blood contained in the digestive tube, submitted to the action of heat and the chemical agents of the intestine, became converted into a blackish matter, in which were still to be recognized by the aid of the microscope some globules of red blood; one portion was rejected by the vomitings, and the other part by the stools, in the midst of a most alarming state

which gave little hope, and which ended by its disappearance in a most unexpected manner.

After the fact of the hæmorrhage in this child, the most remarkable circumstance is the cure. It matters little whether this should be ascribed to the slight extent of the anatomical changes in the intestine or, on the contrary, to the influence of the therapeutic agents employed; but it must not be forgotten that the recovery was perfect, and that since that period the child has enjoyed excellent health.

The other case relates to a girl nine months old, ill for some time, and labouring under simple chronic enteritis. In the three last days of her existence, this child rejected, by stool, black matters, similar to earth mould mixed with white of egg; here and there several striæ formed of pure blood were observed. Death came on in the midst of convulsions.

Thus, it will be remarked that several varieties of hæmorrhage from the intestines, already exist amongst infants and children at the breast, which may be referred either to the accidental morbid constitution of the children, as in purpura, whatever idea we may otherwise entertain as to the nature of this disease; or to an accident, as the compression of the cord, or of the entire fœtus, during the delivery; or, lastly, to the ulcerative process of acute or chronic inflammation of the intestines, to invaginations, polypi of the rectum, or anal fissures, as M. Trousseau has observed.

Unfortunately all the blood which exudes from the vessels does not always pass out of the intestine, it may remain and there accumulate, which renders the situation of the patients one of great danger. This is what is frequently observed in the intestinal hæmorrhage of infants, and death is usually, but not invariably, as Billard states, the consequence of this disease.

The blood may be expelled from the intestine by the rectum, or by the mouth if it is rejected by the efforts of vomiting. This fact, although of rare occurence, has yet been observed, and it naturally explains itself by the seat of the hæmorrhage being in the stomach or in the superior part of the alimentary canal.

The blood, expelled by the stools, does not preserve its vermilion red colour, unless it is rejected at the moment or very soon after its escape from the vessels, but if it remains in the intestine, it becomes decomposed and altered; it undergoes a commencement of elaboration, it is in some manner digested; and as to the small quantity which comes from the superior parts of the digestive tube, it is voided black, sometimes still to be recognized, but more frequently transformed into a blackish matter similar to earth mould mixed up with albumen, and there may yet be discovered, by the aid of the microscope, some altered blood corpuscles.

In the present state of science, it would be difficult to point out the means of recognizing the precise seat of an intestinal hæmorrhage. In this respect, the difficulty is the same in the child as in the adult, and

all the attempts yet made, in order to arrive at a satisfactory result, have proved useless.

The hæmorrhages of the newly-born, consequent on passive congestion of the intestine, are generally very abundant; the blood is expelled from the intestine in the liquid state, and of a black colour. The flow is less in cases of hæmorrhage which are in connection with purpura. On the contrary, it has been considerable in the hæmorrhage which we have observed to coincide with an acute enteritis. The blood then possessed particular characters which are perhaps special to this variety of hæmorrhage: this is what future observation may decide. The blood was red and florid, instead of being black, as in the preceding varieties; it copiously tinged the linen to a considerable extent. What may lead to the belief that in this case the hæmorrhage had been extensive, was that several days after its cessation, the child still voided blackish matters formed of half digested blood.

It is easy to foresee the dangers which result from these hæmorrhages in young children. The nature of the exciting causes further adds to the importance of the disease. It is the more to be dreaded in proportion as the children are less advanced in age. However, recovery is possible, but, as we have already remarked, it is very rare, and we cannot too much endeavour to obtain it.

The therapeutic indications rest on the exact knowledge of the very nature of the causes of the hæmorrhage. Each variety requires the employment of special and opposite means. Thus the treatment of the intestinal hæmorrhage of *purpura* is entirely opposed to the treatment of the hæmorrhage caused by *an acute inflammation* or by a polypus of the rectum. In the first case we must act by means of tonics, and in the second it is to antiphlogistics or to the surgeon we must have recourse. The same is the case with every other cause that can be named.

The hæmorrhages which are in connection with *purpura* should be treated *directly* by astringents and styptics; *indirectly*, by general remedies, tonics, such as sweetened wine and water; syrup of gentian, antiscorbutic syrup, the syrup of quinquina, in the dose of two spoonfuls in the twenty-four hours; *impure quinine* in the dose of three grains a day in syrup.

The hæmorrhages caused by passive congestion at the moment of birth require a slightly different treatment. The styptics of which I shall presently speak here find their application as in the preceding case, but the general treatment is no longer the same. When the child is plethoric and all the tissues appear gorged with blood, if it is at the moment of birth that the hæmorrhage has taken place, the cord should be allowed to bleed before applying the ligature; at a later period, when we cannot let blood by the cord, a leech should be applied to the anus,

or two, by exception, if the first has not produced a lessening of the congestion—for at this age two leeches which draw much blood may produce irreparable mischief. When the child has no external sign of plethora, and has no symptom of the state called apoplectic, we must be careful of the abstraction of blood, which is no longer indicated, and which can have no other result than to add to the weakness produced by the intestinal hæmorrhage, that which they habitually occasion themselves.

In the hæmorrhage caused by acute or chronic inflammation of the intestine, we must not think of the use of leeches. These inflammations almost always constitute adynamic diseases; and if the hæmorrhage presents itself in their progress, it is at an advanced period, at the period of ulceration, when the feebleness is extreme, and when, consequently, antiphlogistics are rarely indicated. It is by means of acid astringents or styptics that they should be treated—medicines which also find their application in the other varieties of hæmorrhage previously described. These are styptic means properly so called.

Under this title may then be employed in the various kinds of intestinal hæmorrhage of little children, cold water externally to the abdomen, internally by the mouth, or by enemata frequently repeated. These enemata should be composed of two or three large spoonfuls only. They may be rendered more active with three grains of tannin, or with seven grains of the extract of rhatany, or seven grains of catechu, or lastly, with one grain of nitrate of silver. In this latter case a small glass syringe and distilled water must be used in order to avoid the premature decomposition of the medicine.

The extract of rhatany, catechu, tannin, acetate of lead, may be given internally, but with great caution, regard being paid to the tender age of the children, and also without losing sight of the cause of the hæmorrhage, which should, in some cases, prevent their employment. Their use should be abstained from in passive intestinal hæmorrhage with the apoplectic state. On the contrary, they may be employed on nearly every other occcasion in the dose of one grain for every $\bar{3}$ iss. of the vehicle for the rhatany, the catechu, and the tannin, and the acetate of lead in the dose of one-sixth of a grain.

As to polypi in the rectum, they should be made to extrude by means of an enema or a purgative; a ligature should then be applied round the pedicle, and excision performed according to the rules pointed out in surgical treatises.

[Dr. West relates three examples of intestinal hæmorrhage: one occurring soon after birth, another between the second and third month, and the third at the tenth month. Dr. Willshire (*British and Foreign Med. Chir. Rev.;* July, 1853) has seen two cases in which, during the first month, some amount of blood has been ejected, both by the stomach and bowels, both patients recovering, but reduced to a severe

condition of anæmia; and the following case was reported to him by Mr. Lovell, of Chelmesford: Child of the male sex, born on the 5th of April; labour quite natural; no inordinate pressure on the infant; the cord not cut or tied prematurely; and no signs of apoplectic stupor, asphyxia, purpura, or unnatural lividity of any kind. Child cried loudly when born, was vigorous and lively, and rather beyond the average size. On the fifth day after birth, the appetite failed, child became drowsy and inactive, obscure symptoms of general *mal-aise* continued to prevail, when on the 15th of April, it suddenly appeared sinking, the surface becoming cold and clammy. A stimulant was given, which soon afterwards ejected from the stomach a considerable quantity of blood. The bowels were afterwards relieved, the motions containing blood, which, together with the hæmatemasis, continued to occur at intervals until the 17th of April, when the patient died. *Post mortem:* "Stomach greatly distended with a dark reddish brown thick fluid; œsophagus full of the same, so that on slight pressure it oozed from the mouth; mucous membrane of the stomach had a reddish blush, and was covered with a thick layer of blood and viscid mucus; colon with patches here and there apparently marked by portions of coagula escaped from the stomach. Liver very large, hard, of a deep mahogany colour, and evidently loaded with blood."

The following case recently occurred (*Association Journal;* June, 1834) in a child who cried strongly when born, the cord being tied after its pulsation had ceased: The following day at noon the mother and child were progressing favourably; the bowels of the latter had been properly evacuated without the aid of castor oil, and nothing had been given but the breast; about four p.m. the mother was alarmed by a sudden and copious discharge of blood, which she afterwards described as running in a stream from the bowel when the infant was held over a chamber vessel. From this time until ten p.m. the infant had more or less hæmorrhage, and once the mother removed from the bowels what she described as looking like a "long red worm" (coagulated blood). Gallic acid was ordered, but the little patient was too weak to take many doses, and expired about two a.m., ten hours after the first appearance of the hæmorrhage. Restlessness was the only antecedent symptom to the profuse hæmorrhage. On the *post mortem* examination made thirty-six hours after death, all the viscera were observed to be healthy, but completely blanched like the general surface of the body; the intestines, both small and great, were filled with effused blood, in some places fluid, mostly coagulated, and moulded to the intestines, which were firmly contracted upon the coagula. The latter in one case exceeded the size of a goose quill. The fluid portions of the blood were dark, inodorous, and with difficulty washed off the mucous membrane, owing to the thick tenacious mucus covering the latter, which was in its whole extent uniformly stained with a light pink colour; not the slightest trace of any organic lesion could be discovered, although the alimentary canal was most carefully examined in its whole extent.

The blood may accumulate and be retained so that none appears externally, and yet the patient die of hæmorrhage.

M. Bednàr *(Krankheiten der Neugebornen, &c.)* relates a case highly illustrative of the latter statement. On the eleventh day after birth, the boy's skin (then of a pale yellow colour) diminished in warmth, the impulse of the heart became dull and prolonged, and the respiratory murmur scarcely perceptible. The child lay almost motionless and slumbering. The day following, the surface could scarcely be kept warm, and the little patient had to be aroused to suck. On the twentieth day after birth it died. The brain was found to be anæmic, the lungs plethoric, whilst blood was effused into the duodenum and stomach.—P.H.B.]

CHAPTER XI.

ON ABDOMINAL HERNIA.

Instances of abdominal hernia amongst the newly-born and children at the breast are common enough; they are *congenital* or *accidental*, and are situated at the *umbilicus* or *inguinal canal*.

On Umbilical Hernia.

Congenital umbilical hernia, described under the name of exomphalos, or omphalocele, is characterized by the presence of a sac of greater or less size situated at the umbilicus and filled by one or several folds of intestine. Sometimes the dilated base of the cord forms the sac; in this case great care must be taken not to include in the ligature the fold of intestine which constitutes the hernia. Sometimes the tumour is of so great a size that the ligature of the cord near its base is out of the question, and the children appear consigned to a certain death. But this, however, is not always the case; for M. Requin has seen a child recover who was born with an exomphalos as large as the fist.

The tumour was reducible, and was formed of the transparent coverings at the base of the cord. After the reduction of the intestine, the opposite margin of the umbilical opening could be approximated, and the child ceased to suffer and to cry out.

He took but slight nourishment in the first days which followed birth, then he had several evacuations of the meconium.

The tumour, which had been covered by a waxed cloth moistened with oil of sweet almonds, increased in volume, became irreducible, and its walls presented all the phenomena of a peritonitis, but of a local one. This inflammation made progress, the child got worse, and was seized with an abundant diarrhœa, which gradually increased.

On the eleventh day, the diarrhœa was arrested, the child was more calm, the tumour of less size, one portion was gangrenous, the other suppurating; lastly, on the twenty-first day, there was no tumour projecting from the umbilicus; the child had recovered its strength and plumpness; and, after fifty days, the umbilical wound from circular had become oblong, was only one inch long and six lines broad, and all the functions of the child were accomplished in a satisfactory manner.

Accidental umbilical hernia is observed at a more or less distant interval after birth in children who cry much. The cutaneous umbilical cicatrix separates itself from the deep cicatrix, and forms a small opening or eventration by which the intestines protrude at the time of the cry and efforts of the child. This hernia, entirely reducible, covered by the skin, presents the size of a small nut, and

sometimes increases to nearly one inch in length. The finger which depresses it easily penetrates into the umbilical opening.

Accidental umbilical hernia is attended with little inconvenience and causes no suffering to the children. It is a lesion which creates fear for the future, because it may remain, increase in size, and give origin at a more distant period to symptoms of strangulation—a very rare circumstance, however, in this variety of hernia.

We should then endeavour to cure children of umbilical hernia, especially as this is generally a very easy affair. When the hernia is congenital and of small size, in placing the ligature on the cord, the folds of intestines contained in the cord are to be pushed back, and after the fall of the cord, compression should be maintained on the umbilicus by a small pad, properly fastened with sticking-plaister.

Accidental umbilical hernia is always cured by compression, by means of graduated compresses applied by a bandage round the body; by a pad of sponge covered with linen, or by a conical pad filled with bran, as large as a nut, and kept in position by a band of diachylon; or lastly, an elastic band of ordinary caoutchouc or cloth, having a pad at the position of the hernia. Bandages with metal springs are painful, and do not always so perfectly fulfil the necessary indications as the apparatus just mentioned; they should be completely banished in the treatment of children.

When this compression is well applied and is continued for some time under the influence of growth and of the plumpness which the children assume, the cellular tissue of the abdominal walls becomes fixed to the umbilicus, and adhesions take place; the hernial sac disappears, and a cutaneous depression succeeds the umbilical tumour.

[Instances of inclusion in the ligature of a portion of intestine on tying the umbilical cord, against which Bouchut cautions us, are mentioned by Mauriceau (*Traité des Accouchements;* vol. i, p. 497), Sabatier (*De la Médicine Opératoire;* vol. i, p. 152), and others.

The practice recommended by Bouchut, of returning the protrusion, and preventing the reprotrusion by graduated compresses, is preferable to that of Hamilton (Cooper, on *The Anatomy and Surgical Treatment of Abdominal Hernia;* p. 32), who, after returning the intestine, applied a stout bandage around the base of the swelling, and brought the edges of the abdominal coverings together, with two silver needles and sticking-plaister, and the cure was effected in a few days. If the congenital rupture be considerable, and its return in a gentle manner not possible, the child usually dies soon after birth, in which case, the external covering is thrown off, and the intestines are laid bare. Experience, however, proves, that if the swelling be properly protected from all external pressure, granulations may be produced after separation of the external covering, and thus the whole part be gradually covered with firm skin and a tendinous expansion (Ribke, in *Rusts Magazin;* vol. viii, part i, p. 130.—P.H.B.]

Inguinal Hernia.

Inguinal hernia is infinitely more rare than umbilical hernia; it is nearly always congenital, very seldom accidental, and is usually observed in boys. Billard, however, has reported a case of it in a girl, but it was a *congenital hernia of the ovary*. The following is the case:

Josephine Romer, twenty-seven days old, was admitted into the infirmary on the 12th of September. She is strong and appears to be endowed with a good constitution; the belly is slightly tender; there exists at the left inguinal region a roundish tumour, as large as a filbert, rather hard to the touch, cannot be reduced into the abdomen by taxis, does not diminish by pressure, nor does it increase on the cry of the child. It is directed obliquely towards the external labium of the same side, but does not yet quite reach it. The consideration of the situation of the tumour might lead to the belief that it was formed by a congenital inguinal hernia, but the sex of the child did not allow Billard to admit this supposition. He suspended his judgment, and twenty-six days afterwards the child having died of pneumonia, he was enabled to make an anatomical examination of the nature and of the cause of this tumour.

The body was very much emaciated; there was a very decided injection of the intestinal tube, inflammation of the follicles of the large intestine and very well marked hepatization of the right lung at its inferior lobe and posterior border.

The hernial tumour was formed by the *left ovary descending through inguinal canal and ring*, which were much larger than usual in young girls. The uterus, drawn by its round ligament and by the ovary which caused the hernia, had deviated from its natural position and inclined towards the left side of the bladder. The left kidney, instead of being on the same level with that of the opposite side, was drawn downwards by the cellular tissue which envelops it, and by a fold of peritoneum, which was connected with the orifice of the sac; the renal artery and vein had yielded to this traction, and were elongated and at the same time narrowed. Lastly, the ovary and the fimbriated extremity of the Fallopian tube, slightly reddened and swollen, were placed free at the bottom of the sac formed by a prolongation of the peritoneum with the cavity of which it communicated. There were no folds of intestine adhering to the neighbouring parts, and the ovary of the opposite side was in its natural situation.

On a careful examination of the round ligament of the uterus, of the side on which the hernia existed, I observed that it was much shorter than that of the opposite side, and that it terminated in the thickness of the external labium by an aponeurotic expansion, instead of being lost in delicate filaments as is most usually remarked; so that it would appear that this ligament, of less extent and more solidly fixed to the external lip than is commonly observed, had in the first instance caused deviation of the womb, and, in consequence, the traction of the ovary across the inguinal ring. From this abnormal adhesion it thence resulted that all the extensible and mobile parts of the left side of the abdomen, which had connections of continuity or contiguity with the hernial parts, had themselves been drawn down towards the side of the hernia, because they could not separate from each other, nor follow the movement of ampliation of the abdomen during the development of the child in the uterus.

With the exception of the case of inguinal hernia formed by the ovary, there is no congenital and inguinal hernia formed by the intestine amongst newly-born girls.

They are all observed in boys, and are the result of the descent of the testicle, which passes from the abdomen into the tunica vaginalis, pushing the peritoneum before it. The pouch formed by the peritoneum usually closes at the top of the inguinal ring, and intercepts all communication between the testicle and the abdomen. But when this occlusion does not take place, a sac consequently exists, communicating with the abdomen, and in which omentum, intestine, or liquid may descend. This is the *rationale* of the development of the inguinal hernia of infants.

This hernia does not always exist at the time of birth, and may become developed at the end of several days, simply under the influence of the cries and struggles of the child. In this case, the anatomical disposition of which we have just spoken still exists, and favours the descent of the viscera. There are even some rather rare cases in which, without hernia, this communication of the abdomen with the tunica vaginalis has been observed a little after birth.

A. Cooper has seen two more extraordinary cases, in which, after the closure of the tunica vaginalis at the situation of the ring, the viscera had pressed upon the cicatrix, pushing before it the peritoneum and forming an artificial sac; but this cannot take place until some time after birth. Hunt has operated on a case of this kind in a child twenty days old, and Lawrence in one of fourteen days. These cases belong to the history of accidental inguinal hernia.

Congenital inguinal hernia is more serious than umbilical hernia. It is more painful and often causes colic in children. It gives much trouble to keep it in position, and its cure is very difficult. It is never the origin of serious symptoms.

Accidental inguinal hernia, coming on a greater or less time after birth, is, on the contrary, very dangerous, as dangerous as that of the adult, and may occasion strangulation of the viscera, or vomitings, constipation, peritonitis, and death, or otherwise the results of a very serious operation, which is that of *strangulated hernia*.

Care should be taken not to be deceived by the descent of the testicle, and not to confound the inguinal tumours formed by this viscus with inguinal hernia properly so called. This is very often done, and I have many times taken off mechanical bandages applied on testicles retained in the ring and regarded as ruptures, that is to say, as cases of inguinal hernia. It is known that the testicle is not always in the scrotum at the time of birth, and that it descends more or less slowly. Consequently, there is no opportunity of recognizing a hernia as long as this organ has not assumed the place which it should occupy. In the case where the testicle appears to have descended we must still be on our guard not to mistake a fold of intestine for the testicle, and *vice versâ*. Pott was nearly thus

deceived, for he has seen in three young children a portion of the omentum or of the intestine descend into the scrotum whilst the testicle was still at the ring, or even in the abdomen.

The treatment of inguinal hernia in children, whether *congenital* or *accidental*, consists in compression methodically exercised.

The reduction of the intestine must be effected, and its retention in the abdomen, by means of slightly compressing bandages, which should be often changed, so as to be always dry and to avoid excoriation of the skin. There should be a change of three bandages at least, for they should not be left off at all until a more advanced age. They should be renewed as often as the growth and increase in flesh of the children require it. Lastly, care should be taken each time that the bandage is applied to separate the testicle and to return into the abdomen all the liquid which may have found its way into the scrotum.

In the case of inflammation of the skin covering the hernia, emollients, cataplasms, and baths should be made use of.

[It is very rare to meet with strangulated hernia in young children, but such an accident may take place, and Fergusson has operated for strangulated inguinal hernia on an infant only seventeen days old.

The coverings of the congenital inguinal hernia are the same as those of external or oblique, except that the hernial sac is formed by the *tunica vaginalis propria*. In rare cases a second lengthening of the *peritoneum* may descend into the still open canal of the vaginal tunic, by which the intestines, descending into this sac, are separated from the testicle. This encysted hernia, or hernia infantilis, has, as it were, two sacs, viz., one proper sac, and another anterior, composed of the tunica vaginalis, which in these cases is very liable to become the seat of hydrocele (Hey, *Pract. Observ. in Surgery;* London, 1814). The congenital inguinal rupture is mostly intestinal, because the omentum is very short; it may, however, contain a portion of omentum if it has been adherent to the testicle in the abdomen. This is the *encysted hernia* of the *tunica vaginalis* of Sir A. Cooper, in which "on opening the *tunica vaginalis*, instead of the intestine being found in contact with the testicle, a second bag or sac is seen enclosed in the *tunica vaginalis*, and enveloping the intestine. This bag is attached to the orifice of the *tunica vaginalis*, and descends from thence into its cavity; it generally contracts a few adhesions to the *tunica vaginalis*, whilst its interior bears the character of a common hernial sac." Cooper considers that in this case "*the tunica vaginalis*, after the descent of the testicle, becomes closed opposite the abdominal ring, but remains open above and below it. The intestine descends into the upper part, and elongates both the adhesion and *tunica vaginalis*, so as to form it into a bag, which, descending into the *tunica vaginalis*, below the adhesion, and becoming narrow at its neck, though wide at its *fundus*, receives a portion of intestine. * * * The disease does not appear like hernia of the *tunica vaginalis*, as the *testis* is not involved in it, but can be distinctly perceived below it. * * * The strangulation arises from the contracted state of the mouth of the hernial sac."—(*The Anatomy and Surgical Treatment of Abdom. Hernia;* part i, p. 80.)—P.H.B.]

BOOK X.

ON DISEASES OF ANUS AND RECTUM.

CHAPTER I.

ON VICES OF CONFORMATION OF THE ANUS AND RECTUM.

The vices of conformation of the anus and rectum may be divided into *curable vices* and *incurable vices*. The curable vices are:

1st. Congenital strictures.

2nd. Simple imperforations.

3rd. Imperforations with an accidental canal opening, externally or otherwise, with abnormal apertures.

4th. Total or partial absence of the rectum.

The vices of conformation, associated with complex anomalies, constitute a group of diseases completely beyond the resources of surgical art. I shall content myself with pointing out their existence, and shall confine myself to the history of the vices of conformation of the anus and rectum, of which the physician may undertake the cure; I shall, moreover, devote some few words to the study of the causes which have originated the vices of conformation of the anus and rectum.

Causes which have originated the Vices of Conformation of the Anus and Rectum.

Sex and hereditary influence have no part in the production of these deformities; their cause varies according to the very nature of the vice of the conformation of the anus and the rectum. Consequently, the vices of conformation must be separated into two classes:

A. *Congenital vices by contraction or obliteration.*

B. *Anomalies with membranous closure, accompanied or not with abnormal communications.*

The congenital narrowings alone occupy the first category. Sometimes the contraction exists only at the anus, sometimes it is situated higher up, and the canal becomes solid, or rather it undergoes a fibrous or cellular transformation, and still higher up it disappears. The cause of these congenital defects is, as M. J. Guérin has pointed out, to be ascribed to muscular retraction.

The anomalies with membranous closure present themselves in the first rank in the second group. The anus and rectum, isolated at a certain period of embryonic life, increase, the first from the serous layer, the second from the mucous layer. They progress until they meet; their extremities coalesce, and the common conduit is formed when the separating partition has been absorbed. If the complete evolution and the reunion of the blastodermic layers is impeded, an anus without a rectum or a rectum without an anus is formed; if the separating partition remains, the rectum will be imperforate.

During embryonic life, the rectum and the bladder communicate; the urinary and genital canals terminating in one common cloaca. If we suppose that the partition which should lead, in the one part, to the formation of a special canal for the excretion of the urine and for the passage of the fæcal matters, and, on the other part, to that of a genital passage; if we suppose, we say, that this partition be incomplete, we shall observe the imperfections with an accidental canal opening externally, or rather with an orifice terminating in the bladder or vagina. Thus, arrest of development readily accounts for the congenital defects characterized by simple imperforations, or accompanied by abnormal communications.

1st. On Strictures of the Anus.

The strictures of the anus and rectum are characterized by an opening of the anal orifice and of the cavity of the rectum of a degree less than in the natural state. The anus and rectum may offer all the degrees of stricture, from the orifice into which the point of a pin can scarcely be introduced, as in a case reported by Scultet, to the orifice by which the meconium can be discharged; but the fæcal matters only being voided with the greatest difficulty, as in the patient of Boyer. In the majority of cases, the congenital stricture does not extend beyond the anus. The strictures consist sometimes in a simple diminution in the diameters of the anal opening or of the cavity of the rectum, sometimes in numerous multiform folds projecting into the rectum; and which, according to their degree of development, may obstruct the physiological function of the last portion of the large intestine.

The signs of congenital stricture are the absence or deficiency of the meconium in the linen in which the child is enveloped, the progressive and painful tension of the abdomen, and vomiting; the pathognomonic sign is furnished by the direct inspection of the anus.

Immediate attention should be given to children afflicted with stricture of the anus and rectum. If the stricture is very slight, the rectum is to be restored to its natural diameter by the introduction of a bougie or of a small piece of prepared sponge into its cavity; if the stricture is

considerable, and if the symptoms developed on the part of the intestine threaten the existence of the child, the opening is to be enlarged by a bistoury introduced, or a grooved director, incising the anus on one or both sides according to the degree of the stricture. As soon as the incision is made, the meconium escapes, and the symptoms of its retention cease. In order to prevent the reunion of the edges of the incision, a tent covered with ointment is to be introduced, the size being gradually increased and reintroduced each time after the child passes the motions, continuing for many months the use of the tent or of a bougie of Indian rubber.

2ND. ON SIMPLE IMPERFORATIONS OF THE ANUS AND RECTUM.

The simple imperforations of the anus and rectum are produced by a closure at the situation of the terminal opening of the rectum; this closure may be formed by the skin, and then the *raphé* is prolonged on the skin which closes the anal orifice, the rectum terminating in an adherent pouch below; such is the case reported by Saviard.

The anus may be closed above the sphincter by the mucous membrane; and of this J. L. Petit has related an example.

J. L. Petit has made us acquainted with another mode of imperforation of the anus which is thus characterized: the contracted sphincter enters into union with the inferior extremity of the rectum, and the anus is replaced by a resisting part of considerable thickness, in the midst of which the rectum, usually dilated into a pouch, adheres. Lastly, M. Voillemier* has seen a child in whom the intestinal tube was divided by partitions into four distinct portions, of which the first only contained meconium and gas, the others enclosing a thick mucus.

Whatever may be the nature of the imperforation of the anus, when the fæcal matters cannot escape by an abnormal aperture, these matters accumulate in the intestine, distend it, and give rise to fatal symptoms, if the infant is not promptly relieved.

The symptoms which characterize simple imperforations of the anus and rectum are, absence of the meconium in the linen fastened to the child, tension and pain of the abdomen, restlessness, cries, nausea, soon followed by yellow or green vomitings, injected countenance, prominent eyes, distention of the jugular veins, hiccough, and convulsive movements. When called to a child labouring under these symptoms, the surgeon makes a careful examination of the anus, and easily discovers the imperforation and the nature of this vice of conformation by the presence of a projecting membrane, of a bluish colour, giving on pressure a sensation of fluctuation.

Amongst children afflicted with simple imperforations, the surgical

* *Gaz. des hôpitaux;* 1846.

operation is easily performed; a simple incision should be made with a bistoury on the spot where the anal opening should be situated: superficial, if the imperforation is only formed by the skin or the mucous membrane; deep, if it is constituted by the musculo-cellular layer. We may also have recourse to the crucial incision as M. Bouisson of Montpellier has done.* The surgeon will be apprised that the obstacle to the course of the fæcal matters is removed by the escape of the meconium. After the operation an enema should be administered, and the wound dressed the following days with a tent smeared with ointment. In order to avoid the contractions consecutive to obliterations of the rectum at some distance from the anus, M. Malgaigne recommends the following method of proceeding: the little finger is introduced into the anus, the septum discovered, then the anus is enlarged in front by a cut with the bistoury; the child struggles, and at each effort the partition in the rectum is observed to appear on a level with the skin. It is then seized with tenaculun forceps, divided crucially, and the two posterior angles excised; after which the rectum is emptied of the meconium it contains. With respect to the anterior angles, after having deprived them of their mucous membrane, on the side towards the anus, they are drawn down to a level with the cutaneous incision to which they are united by several points of interrupted suture.

When performed early, the operation for simple imperforation of the anus or rectum succeeds in an immense majority of cases; the practitioner should be always on his guard against several accidents which may accompany this operation; these are, arterial hæmorrhage from the walls of the rectum, meconial abscess, and contraction at the situation of the incised parts.

[Through the kindness of my friend Mr. Tapson, I have had the opportunity of witnessing the following case: a female child was born nearly dead, with feeble respiration, blue surface, and deformity of the left hand. On the second day, no meconium having passed, an examination was made; the anus was well formed, but on introducing the finger an obstruction was discovered about half an inch from the anus; it gave the sensation of a membrane which, on the feeble efforts of the child, became more tense; the child continuing in a state of cyanosis with feeble respiration, any operative proceeding was deemed useless and cruel; it died on the fifth day, having taken only a few teaspoonfuls of nourishment; there was no vomiting with the exception of a slight effort on the second day, when a little fluid tinged with bile escaped; the abdomen became much distended before death.

Autopsy. Lungs free from congestion, collapsed, but restored by insufflation; it was evident, however, that air had never entered some portions which required strong efforts of insufflation to distend them. Both auricles, especially the right, were distended with clots; the foramen ovale was only two thirds closed by a thin membrane, the free edge being directed anteriorly; the ductus arteriosus was widely open. The peritonæal cavity contained much gas and fæcal matters, but there was no trace of any inflammatory products. About three inches

* *Thèse de concours*; 1851.

from the appendix vermiformis, a long rent in the peritonæal covering of the colon was observed, showing the mucous membrane beneath; this was softened and thinned, and presented a circular opening less than half an inch in diameter, the edges of which were irregular from small shreds of the mucous membrane; the vessels were much congested in the neighbourhood of the rent, but no signs of inflammation were observed, the rent being apparently the result of mechanical distention. The rectum terminated in a perfect *cul-de-sac*, the distended hæmorrhoidal vessels ramifying over the extremity, all the coats of which were perfect and not the slightest trace of any opening was observed; the vessels of the mucous membrane were considerably injected; the large intestines contained no meconium but a large quantity of firm, bright-coloured fæces.—P.H.B.]

3rd. On the Imperforations of the Anus and Rectum, with Abnormal Communications of this Intestine.

These imperforations may be divided into three categories.

First category. Imperforations, with opening of the rectum on the cutaneous surfaces.

Second. Imperforations, with opening of the rectum in the bladder or urethra (in the male and in the female).

Third. Imperforations, with opening of the rectum in the womb and vagina.

1. Imperforations, with Opening of the Rectum on the Cutaneous Surface.

In this vice of conformation, the end of the intestinal tube opens at one of the points of the circumference of the lower part of the abdomen, where it performs the function of the anus.

M. Bouisson *(Thèse citée)* relates a curious case of this vice of conformation observed in the practice of Delmas.

"A child was brought to Delmas, from seven to eight days old, who was born with an imperforation of the anus, and with a small corrugated opening, red and excoriated, which existed about half an inch from the median line on the side of the right buttock. By this opening the fæcal matters were constantly oozing, the liquid state of which allowed their rather easy escape. It constituted a true congenital fistula of the anus, on which Delmas operated, at the same time that he remedied the imperforation by an incision. The obstructing membrane was cutaneous, mucous, with conservation of the sphincter. M. Delmas incised it, introduced his finger into the rectum, when he recognized, at an inconsiderable height, the end of a grooved probe introduced in the accidental opening. The operation was performed as in the adult, and followed by the rapid recovery of the infant."

M. Denonvilliers related at the Chirurgical Society, in 1850, the case of an infant in whom he had cured an anal imperforation, with an abnormal course.

In cases similar to those which happened to M. Delmas and M. Denonvilliers, the surgeon will easily diagnose the nature of the defect of conformation, and he should not hesitate to attempt the operation practised by the surgeon of Montpellier.

2. Imperforations of the Anus and Rectum, with Opening of the Rectum in the Bladder or Urethra.

1. *In the male.* This kind of imperforation is characterized by the opening of the rectum in the base of the bladder between the ureters, in the neck of the bladder or in the membranous portion of the urethra, by a very small orifice or by a narrow canal. Below the abnormal orifice the rectum is sometimes immediately obliterated—sometimes prolonged—under the form of a sinus of variable extent. These anomalies present, besides the signs of simple imperforations, the oozing of the meconium and the expulsion of gas by the urinary canal; they are in general followed by very rapid death. Flajani, however, cites the case of a child who lived several months with this defect of conformation.

If the anal imperforation is situated at a considerable height, and if the communication between the bladder and the urinary canal is extensive, this vice of conformation may escape the investigation of the surgeon. The absence of stools, colic, the yellow stains on the linen find their explanation in constipation and the natural flow of urine. Such a mistake in the diagnosis is very serious; it leaves the infant in a state of suffering, and one which may cause a speedily fatal cystitis; but it cannot long pass undetected by the attentive practitioner.

When the practitioner shall have decided that the anus is only obliterated by a small membrane, the rectum should be opened by the natural way.

But the obliteration of the anus by a thin membrane, accompanied with abnormal communication, is entirely exceptional, and in the immense majority of cases the practitioner will act prudently in abstaining from any kind of operation.

2. *In the female.* We shall not give the history of the vices of conformation of the anus and rectum, with abnormal communications in the urinary apparatus in the female, for the facts reported in science on these anomalies are not sufficiently well authenticated.

3. Imperforations of the Anus and Rectum, with Opening of the Rectum in the Vagina.

When this vice of conformation exists, the abnormal opening gives passage to the excrements; it is not, in addition, accompanied by any functional derangement, it simply prevents the inconvenience of a disgusting infirmity. The genital anus may be vaginal or vulvar; less serious in the first case than in the second, it does not give rise to fatal results without the abnormal orifice is very narrow, and causes retention of the meconium.

The vaginal anus, except in the case of constriction of the orifice, does not compromise the existence, it even permits the functions of

the vagina and of the uterus; thus Boyer relates the cases of women who have lived with a genital anus to a very advanced age, and Fournier cites the case of a woman afflicted with a vaginal anus who became a mother.

Boyer looked upon the imperforation of the rectum with a vaginal orifice as incurable; at the present day the surgeon should endeavour to remedy this repulsive infirmity. The most suitable method of operating is that of Dieffenbach.

Dieffenbach's mode of practice. The perinæum is to be divided from the vulva to near the coccyx, avoiding the rectum; the cellular tissue which surrounds the extremity of this intestine is to be dissected and thrown back, and it is to be isolated from the vagina in its inferior semi-circumference; and having divided the resulting flap to a small extent, the two halves of this flap are fixed by two points of suture to the posterior extremity of the wound of the perinæum. When this wound is healed, by means of a bistoury the superior wall of the rectum is completely isolated from the vagina. The intestine, thus rendered free, recedes about four or five lines; and when the inferior and anterior parts of the division of the perinæum have been made raw, there only remains the reunion of the edges of the division of the vagina by points of interrupted suture, and the wound of the perinæum, with the exception of the posterior portion destined to form the anus, by two points of twisted suture.

4th. On Absence of the Rectum.

Under this title we rank the vices of conformation in which the rectum is partially or entirely wanting. Sometimes the interval which separates the anus from the rectum is supplied by a fibrous cord, sometimes it is occupied by a very indurated tissue; the intestine terminating in a dilated pouch. Sometimes this dilatation is situated even on the rectal portion of the digestive tube, sometimes it is seated on the colon. The symptoms, by means of which absence of the rectum is revealed, are—the complete want of stools, and the inspection of the perinæal region. In the simple imperforations, the surgeon discovers on the spot where the anus should be, a fluctuation which does not exist in the case of absence of the rectum. In obscure cases, the surgeon may, with great precaution, make an exploratory puncture over the position of the anus; when the rectum is simply imperforate, there will be a flow of meconium; when the rectum is wanting, no issue of meconium will follow the puncture.

The following is the extract of a case reported by M. Forget,* which throws light upon some of the symptoms which characterize absence of the anus.

* *Union médicale*; 1850.

Case. A child of the female sex, thirty-six hours old, and not voiding the meconium, in spite of the existence of an anus, apparently well formed, was submitted to my examination. On the spot occupied by the abnormal anus was observed a cavity surrounded by diverging folds which all met towards its base; this cavity, entirely formed by the skin, terminated in a true *cul-de-sac*. On widely separating the buttocks, the folds which surrounded and in part formed this cavity were effaced, and its base was observed to become depressed and to be stretched transversely on the slightest effort of the child. The examination by the finger, practised whilst contraction was taking place, transmitted the sensation of a firm and tolerably resisting surface, and not at all that of fluctuation. The child was in other respects very well made. The genito-urinary organs were in the natural state. The urine was passed without admixture of meconium. No vomiting had taken place. The exploration of the anus with a small trochar did not give issue to any excremental liquid. The child died eight days afterwards.

Cases of the absence of the rectum constitute the most serious vices of conformation, they infallibly lead to death in the space of some days from want of nutrition; the duty of the surgeon is then to remedy so serious an anomaly by an operation. To which practicable operation ought he to have recourse? The only practicable operation amongst infants, in whom the rectum is wanting, is the creation of an artificial anus. The surgeon has the choice of three methods; they are distinguished by the names of perinæal, iliac, and lumbar methods.

Perinæal method. This method consists in making an artificial anus in the situation where the true anus should be. It is followed by failure, if the rectum is wanting in a great extent, and often determines incontinence of the fæcal matters or a contraction of the recto-cutaneous canal. It exposes the patient to the risk of perforation of the bladder, and possesses no other advantage than that of restoring the anal aperture to its proper situation, instead of creating a disgusting infirmity at the iliac or lumbar region, as results from the following methods of procedure:

Iliac method, or that of Littré. This method necessitates the opening of the peritonæum; we agree with M. Malgaigne that the lumbar method should be preferred to it.

Lumbar method. It is to Callisen that the honour is due of having introduced into surgery the idea of forming an artificial anus in the left lumbar region. More recently, M. Amussat has modified the method of Callisen, and practised it in the following manner:

The patient is placed on the abdomen, inclined a little towards the right side, and the abdomen supported by one or two cushions. A transverse incision is made in the integument, on the left side, two inches above the iliac crest, commencing at the extreme edge of the mass common to the sacro-lumbalis and longissimus dorsi, and carried outwards to the extent of four or five fingers' breadth. After the skin and the subcutaneous layers the great dorsal is reached, which should be divided across in the posterior third, and then the great oblique,

which is divided in the two anterior thirds; beneath them the small oblique, then the transverse, then the aponeurosis. All these muscular layers should be divided transversely, then vertically, in order to have a crucial incision, and the better to ensure the discovery of the intestine; should it be necessary, the external edge of the quadratus lumborum may be raised and incised at its external edge. We then come upon the adipose tissue which envelops the colon, and which must be cautiously raised; after which the important point is to be assured of the position of the intestine and of its limits.

On the dead body the colon is recognized by its greenish colour. This sign rarely exists in the living. By percussion we may make sure that we are on some intestine; pressure with the finger gives the sensation of resistance of the intestine; nevertheless, to do away with all doubt, the intestine should be laid bare on its two sides. If the intestine is contracted it should be sought for posteriorly; sometimes in this case it is completely hidden under the quadratus lumborum, which should be divided.

When the colon is discovered two needles should be passed through its wall, so that it can be steadied by two threads of silk about one inch apart. In the interval between these two threads a stab with the trocar should be given, the issue of gas or of thin fæcal matters assures us that we are unmistakably in the intestine, and with a hernia knife a crucial incision should be made. The fæces commence to escape: their expulsion should be assisted by injections directed towards both ends of the intestine. When the bowels are well emptied, the opening made in the intestine should be drawn forwards by means of forceps; and it should be fixed to the skin by four points of interrupted suture, the mucous membrane being turned outwards.

[Examples of this disease, in any form, are so rare that it is not easy to estimate the comparative frequency of its varieties. Dr. Collins (*System of Midwifery*, p. 509) only met with one instance of it out of 16,654 children, born in the Dublin Lying-in Hospital, during his mastership; and Dr. Löhrer of Vienna (*Canstatt's Jahresber, für* 1854; bd. i, s. 456), mentions that he met with it only twice out of 50,000 new-born children. A comparison of seventy-four cases derived from different sources, yielded seventeen belonging to the first class, twenty-nine to the second, and twenty-eight to the third; but it is probable that many instances of simple closure of the anus have passed unrecorded, while all the instances of more serious malformation have been described.—(*West on Diseases of Children*; p. 379.)

If the obstruction be situated at the orifice of the anus, a crucial incision through the membrane which closes it, or the introduction of a trocar, will afford immediate relief. The prognosis in these cases may be very favourable, for in fifteen cases of this kind, all but one had a favourable issue.

"The existence of an anus, and a small extent of gut above it, although a decidedly favourable feature in a case, does not warrant quite so hopeful a prognosis as we might in the first instance feel disposed to adopt. The probabilities

indeed, are, that the distance is not great between the end of the rectum and the *cul-de-sac* in which the anus terminates ; yet a considerable space may intervene between the two; or as in a case which Mr. Arnott was so good as to communicate to me, the rectum may be found altogether absent, the colon terminating in a blind extremity, and floating loose in the abdominal cavity. In the majority of instances the two blind pouches are connected together by the intervention of an eighth of a quarter of an inch of dense cellular tissue, which sometimes presents an almost ligamentous character ; and in some cases the end of the large intestine is situated anterior to the extremity of the *cul-de-sac* that leads from the anus. Owing to this latter circumstance, the operation for the relief of this condition has sometimes failed ; the instrument, although introduced deep enough, yet passing behind the distended bowel. Out of nine cases of this kind, eight had a fatal termination ; the bowel on four occasions not having been reached at all, while once the opening made into it was too small to allow of the free escape of the meconium. It may be added that in three of the fatal cases there existed such contraction of the calibre of different parts of the large intestine as would of itself have opposed a serious obstacle to the child's recovery."

"In twelve cases the anus was absent, and in some of these instances no trace of it existed, while the rectum terminated in a *cul-de-sac*, at from one to two inches from the surface. In five of these cases the attempt to open the intestine was successful, and the child eventually did well ; while in two other cases, although temporary relief followed the operation, yet symptoms of inflammation of the bowels came on, which terminated fatally in the course of a few days. In three instances it was not found possible to reach the bowel ; and in two others, although an opening was made, yet its size was insufficient to afford a free vent to the accumulated meconium, and the fatal issue, though deferred, was not prevented. Failure to reach the intestine seems to have depended either on the trocar not having been introduced sufficiently deep, or on its having been directed too far backwards. The danger of hæmorrhage, or of wounding the bladder, of which some operators seem to have been apprehensive, is not much to be feared, for I find but one instance on record in which the bladder was accidentally wounded, and not one of fatal or of even serious hæmorrhage. Better success also seems to have been obtained in those cases in which a sufficiently deep and free incision was made with a bistoury in the direction of the rectum, than in those in which a trocar was at once introduced. The suggestion of M. Amussat, that in these cases the blind sac of the intestine should be drawn down, and its cut edges attached by sutures to margin of the external skin, in order to prevent the infiltration of fæcal matter between the end of the rectum and the wound in the integuments, and to diminish the danger of the aperture closing, is worth bearing in mind. It was adopted with apparent advantage by Mr. Waters, in a case of this kind recorded by him in the *Dublin Journal* for May, 1842, on which he operated with success."—(West, *Op. Cit.;* p. 382.)

In a case where the rectum opened into the vagina, and after operation the artificial opening of the *rectum* closed again, whilst the opening of the *vagina* remained, Barton (*Medical Recorder of Medicine and Surgery.* Philadelphia ; 1824) employed the following method with success : he passed a director through the hole of communication in the *vagina* and divided the whole wall of the *vagina* to the place where the natural opening of the *rectum* should be. He did not use any dressing, but every day passed the finger, smeared with cerate, into the *rectum* to prevent its closing. The *vagina* was perfect and the *rectum* had a direct opening, except that the stools passed involuntarily. Satchell *(Ibid)* and Chelius have by this practice obtained like favourable results. Velpeau (*Elements de Med. Oper.;* vol. ii, p. 979) had proposed this operation on the recommendation of Vicq. d'Azyr.

The result is highly unfavourable when there is a communication between the intestine and the bladder or urethra in the male, for eight out of ten cases of the former kind, and the same number out of nine of the latter kind, ended in the death of the infant. The connection with the bladder is generally established by means of a very slender canal which enters that viscus at or near its neck; but in one instance in which the rectum was wanting, the colon terminated by opening with a wide aperture into the upper part of the bladder. A slender duct is likewise the usual channel of communication between the rectum and the urethra, and this duct generally enters the membranous portion of the urethra, just in front of the prostrate. Cruveilhier (*Anat. Pathol.;* liv. i, p. lv, fig. 6), however, mentions an instance in which the rectum opened under the glans penis, by means of a canal which was formed in the substance of the *raphé scroti;* and South (*Trans. of Chelius;* vol. ii, p. 329) mentions a somewhat similar case in which there was a small aperture through which meconium passed in front of the scrotum, the rectum was cut down upon full an inch deep, and though much difficulty was experienced in keeping the passage free, yet the child survived, and grew up to manhood. Of the two other successful cases recorded by Miller (*Edin. Med. and Surg. Journ.;* No. 98, p. 61) and Fergusson (*Ibid;* vol. xxxvi, p. 363), both were cured, only with much trouble and difficulty.—P.H.B.]

CHAPTER II.

ON PROLAPSUS OF THE RECTUM.

The term *prolapsus of the rectum* is applied to the protrusion of the mucous membrane of this intestine out of the anus, or to the protrusion of the rectum itself by invagination.

Prolapsus of the mucous membrane is more common than invagination; it is a very frequent disease amongst young children, and one which I have observed a great number of times. It is usually present at the same time as diarrhœa, and may be produced by use of too violent purgatives. It follows a prolonged constipation which requires great efforts to pass the excrementitious matters. It is also said that it may be caused by a disordered state of the digestive functions, or by the presence of intestinal worms, or stone in the bladder; but with respect to this there is nothing positive.

Under the more or less active influence of these different causes, the mucous membrane of the rectum, which is rather moveable on the walls of the rectum, protrudes from the anus, and forms a more or less considerable projection, under the form of a reddish round swelling, transversely fissured, and covered with adhering mucosities. This round swelling presents an opening in the centre, which is no other than the orifice of the intestine. Externally the mucous membrane terminates at the sphincter on the edges of the anus, becoming continuous

with the skin, from which it is separated by a simple groove, whilst in the invagination of the rectum the finger penetrates the intestine between the swelling and the sphincter of the anus.

Prolapsus of the mucous membrane of the rectum is not serious amongst children; it is only of importance in the adult and in the old. In youth it is not the cause of serious symptoms, and its radical cure may be obtained without an operation.

In order to cure prolapsus of the rectum we should make use of remedies which are appropriate to the cause on which it depends; but when it persists after every occasioning cause has disappeared, it is a proof that it is dependent upon the relaxation of the intestine, and it is upon the intestine itself that we must act.

The bowels should be kept open, and the system strengthened by a generous regimen.

Then astringent lotions should be made use of, and compresses moistened with red wine, cold water, a solution of sulphate of zinc or alum, about four grains to the ounce. Recourse may be had to sitting baths of cold water, of the decoction of bark, solution of tannin, alum, or the sulphate of iron. Applications of ice, compresses sprinkled over with myrrh, or dragon's blood, or impregnated with the vapour of turpentine burnt over live coal, may be employed; or suppositories composed of pomegranate and oak bark incorporated in honey.

When a child is subject to prolapsus of the rectum, it is proper, as Underwood has remarked, to take the precaution to support the edges of the anus during defæcation with the two fingers. If the child is not sufficiently old, nor intelligent enough to fulfil this indication, the nurse should be instructed to employ it.

According to Underwood, the child should be seated on a chair sufficiently high that the feet do not touch the ground; if it is old enough it should remain standing as long as possible. But these precautions are only necessary when the disease has lasted a considerable time, and when the portion of the intestine which escapes externally is of some extent.

If it should happen, a very rare circumstance in the child, that the mucous membrane, once protruded, should become strangulated by the sphincter and form a very much congested or inflamed swelling, an enema of cold water, to which several drops of liq. plumbi or of laudanum are added, should be administered. After one or two hours, the inflamed intestine becomes less swollen, and gently returns under the influence of the sedative remedy which has relaxed the spasm of the sphincter of the anus.

When the prolapsus continues, the reduction of the mucous membrane should be attempted by means of the taxis. Bell employed a cone of paper, moistened so as to soften it, and oiled externally. This

cone, placed on the finger, was introduced into the opening of the mucous swelling, and gently pushed upwards with continued pressure, and served to reduce the protruded portion of the rectum. The reduction once completed, the finger was withdrawn, then the cone of paper, without fear of drawing the intestine after it.

Some persons place the child between their legs, head downwards, the buttocks elevated, and they press on the tumour, of which they thus cause the reduction.

For my part, I employ the means recommended by Boyer, and which has always succeeded with me. It consists in putting a piece of thin linen covered with ointment on the swelling, then pushing with the finger internally, so as to cause the entrance of the mucous membrane; once reduced, it is supported by one hand, whilst the finger and the linen introduced into the anus are withdrawn. This is the method of Bell, modified by the substitution of linen for the cone of paper.

Very young children, who have been for a long time subject to prolapsus of the rectum, should be seated on a hard and flat stool, or rather on a chair without arms and sufficiently high to prevent them touching the ground with their feet. They should, moreover, have a supporting bandage on the anus, and if they are large should use that which Boyer recommends. It is composed, 1st, of two brass elastic braces, which unite in front and behind by their extremities furnished with a buckle; 2nd, of an oval and rather soft pad, convex on the side of the anus, concave on the opposite side; 3rd, of two straps, one of which, single, is fixed to the posterior extremity of the pad, and the other, double, is attached to its anterior extremity; the posterior strap passes behind the pelvis and is fixed to the posterior extremity of the braces by means of the buckle placed there; the two portions of the anterior strap, after having passed on the internal side of the thighs, reunite anteriorly towards the middle of the abdomen in a single band which is attached to the buckle placed at the anterior extremity of the braces, which affords to the patient the facility, even in walking, of loosening and tightening the bandages at will. The straps should be elastic like the braces, so that they may lengthen and shorten to accommodate themselves to the different movements of the patient.

When the prolapsus of the rectum cannot be kept up by this bandage, recourse can be had to another method also successfully employed by Boyer. It consists of pushing into the fundament a large tent of lint covered with ointment. When this tent is introduced, a large pad of lint is placed on the anus, over this pad a compress is applied, and the whole is sustained by a double T bandage.

Invagination of the rectum has nothing in common with prolapsus

of the rectum, except the presence of a reddish soft tumour, which projects through the anus. This tumour varies from an inch or more to sixteen or thirty inches, of which Fabricius of Aquapendente, Haller, Muralt, and Saviard have seen examples. It was the invaginated colon and rectum which protruded from the anus. This lesion is very rare in children. Thomas Blizard relates a case, observed in a child fifteen months old, which presented an invagination of the rectum more than six inches long, comprising the greater portion of the colon.

This lesion is accompanied by pain, colic, nausea, vomiting, tenesmus, and inability to go to stool or to pass urine.

It is not serious if the invagination is not considerable and can be reduced; on the contrary, it rapidly becomes fatal, when it is irreducible and complicated with symptoms of strangulation.

The tumour should be reduced as far back into the rectum as possible, and by means of enemata or of ascending douches we should attempt to render this reduction more complete and lasting. To this end we may make use of a gum-elastic bougie ending in a considerable enlargement destined to push before it the invaginated portion.

In case of strangulation, incision of the sphincter of the anus has been recommended in order to facilitate the reduction, or the partial excision of the tumour, or its cauterization, &c.; but these operations are impracticable in young children, and should be reserved for the adult.

CHAPTER III.

ON POLYPI OF THE RECTUM.

Polypi of the rectum are very rare amongst young children, however MM. Stoltz, Bourgeois, and Perrin, have observed some cases of it. These polypi are generally fleshy and of a cellulo-vascular structure. They are of a rosy colour, homogeneous, although mamillated and very resisting under the finger. They sometimes exude a little blood under the influence of external pressure.

They remain a considerable time without giving any symptoms of their presence, afterwards they are the cause of a slight hæmorrhage which comes on every six, eight, or ten days; sometimes, on the contrary, this hæmorrhage is much more frequent, and each time of insufficient quantity to throw the children in a state of anæmia, and to seriously compromise their existence. This flow of blood usually appears with the stools, and seems to be brought on by the passage of hardened matters; it is accompanied by acute pains, produced by

the erosions, and sometimes by fissures of the mucous membrane of the rectum.

All the children are constipated, but they are not otherwise ill. At first nothing is seen at the orifice of the anus, and in order to arrive at a diagnosis, the finger must be introduced into the rectum. This is a difficult and very painful exploration; it should only be performed in cases of absolute necessity. At a later period, the polypus, pushed forwards by the efforts of defæcation and perhaps also by the fæces, appears externally at intervals. It is then only that the diagnosis acquires all the certainty desirable.

These polypi do not in general constitute a serious disease, and with the exception of cases of considerable hæmorrhage do not require a precipitate treatment. We may wait, indeed we should wait, save in particular cases, until the polypus appears at the orifice of the anus. Then the operation should be performed which Bourgeois has described, or the method used by M. Perrin in the following case reported by the *Revue Médico-Chirurgicale.*

Case. A little girl, two years and a half old, very intelligent, dark, of a bilio-nervous temperament, and good general health, passed nearly four months before the extraction of a polypus of the rectum which was performed on the 26th of October, 1844, stools tinged with blood. Her mother, being uneasy, caused me to be immediately called in. The health of the child was perfect, and with the exception of a little habitual constipation, I could not, in the absence of all morbid symptoms, discover anything else than a slight flow of blood at the precise instant of defæcation. The blood passed was not at all mixed with the habitually consistent fæcal matter, which it only tinged externally and very often only partially. The defæcation accomplished, the mother examined the child, and the anus was observed smeared by the blood, which did not appear again except at the time of a fresh stool, and never under other circumstances. The flow of blood, of very small quantity, only consisted in an oozing, or a true *stillicidium recti.* It is even correct to add that the hæmorrhage did not always accompany the expulsion of the fæces, that the child was sometimes several consecutive days without losing blood in spite of the daily efforts of defæcation.

In this case, up to this period, apart from the anal hæmorrhage and its mode of appearance, there is nothing in common with the two cases of fissure of the anus observed at the Necker Hospital, but the symptomatologic analogy will be presently apparent, if I add that, in my little patient, there was always pain on going to stool, of which she gave proof by her cries, and principally when the constipation became more intense, and when the fæcal matters acquired more consistence. Several times, and particularly in the case of painful defæcation, on examination of the child, I was enabled to discover a little redness around the anus, with a marked sensibility of this region. The epithelium at the margin of the anus appeared moreover as if cracked, fissured, and like the lips of some persons roughened by the cold of winter, without however being able clearly to confirm the existence of a decided crack or a true fissure. Notwithstanding the absence of this, and taking other circumstances which I am about to specify into account, I should here with some reason have suspected the probable existence of a fissure at the anus, if at the same time I could have positively recognized the spasmodic contraction of the sphincter.

But in my opinion, it is not easy in the child to appreciate the true degree of this contraction, especially when the child cries, and struggles like a little imp on its mother's knees; as soon as you would introduce the finger into its anus, it closes it with an unparalleled energy; this is at least what happened to me in the little child who was the subject of this case. Thus, instead of stopping short at the idea of a fissure, I did not hesitate to suppose the presence of a polypus in the rectum of this child. I hesitated the less, because at the same time I called to recollection the four cases published by M. Bourgeois, and in which the symptoms which the little patients presented were exactly those which I actually made out in mine.

For nearly three months the state of the patient remained the same; and as the general health continued to be perfect, in spite of this slight hæmorrhage which reappeared more or less regularly at the time of defæcation, I thought I could completely tranquillize the parents on the consequences of this disease, and dispense with the necessity of seeking for the polypus by main force, and direct the mother always to examine the anus of her little daughter after each stool.

This examination of the anal opening did not at first present anything worthy of remark. It was only towards the end of the third month from the commencement of the symptoms, that the mother rightly thought she recognized at the base of the half opened anus, immediately after the emission of a stool, the presence of a small swelling, which was only observed on a portion of its surface, the mammilated and deep red appearance of which much resembled that of a raspberry. This tumour did not always present itself after each defæcation; it was only in the last week which preceded its extraction that it showed itself in a more constant manner, and that it at last completely protruded, returning at the end of some minutes. After having been fruitlessly called ten times by the mother in order to perform the extraction of this polypus, which reëntered and disappeared during the time they came to seek me, I at last arrived at a favourable instant, immediately grasped the little tumour towards the base with the the thumb and the index finger, separating the anus as much as possible, seized the pedicle of the polypus which I ruptured with my nails. The pedicle was scarcely ruptured when the polypus escaped from my fingers like the stone from a cherry when compressed in a similar manner, and was projected to the ground.

The polypus, of the size of a raspberry, was exactly applied on the anus, which, in its closed state, exercised a true constriction on the pedicle, so that I did not think it right, in consequence of the cries and struggles of the child, to introduce my finger into the rectum, in order to assure myself of the length of the polypus, and of the exact seat of its growth. The hæmorrhage which followed the extraction of the polypus was very slight indeed; some drops of blood only escaped, and that was all. However, the next day the expulsion of the stool was accompanied by a clot of black blood of the size of a small nut, which was a proof of hæmorrhage from the remaining portion of the pedicle. Since then the hæmorrhage has not reappeared. The cure dates now from more than two years.

When the hæmorrhage caused by the polypus is very slight, and only appears every six, eight, or ten days, we may wait and defer the operation. If, on the contrary, the flow of blood is considerable, and sufficiently frequent to weaken the constitution and bring on anæmia, we should decide on removing the source of the evil.

M. Stoltz has recommended the destruction of polypi of the rectum in children by ligature and the immediate excision below the thread. This advice is very good, and does away with the dangers of

hæmorrhage, but it is very difficult to practise, and on this account is not of so much value as the method of M. Bourgeois. This practitioner simply tears away the polypus by means of the fingers, as may be observed in the case just reported. This method has been employed four times by the author, and once by M. Perrin; it has always succeeded without accidents, and without causing the slightest hæmorrhage.

CHAPTER IV.

ON FISSURE OF THE ANUS.

Fissure of the anus is sometimes observed in children at the breast. It is caused by the straining resulting from constipation, and by the superficial rent of the mucous membrane which lines the sphincter of the anus. It is the origin of the smarting and the burning pains which follow each stool. At this moment it sometimes determines the escape of several drops of blood, but there is never any extensive hæmorrhage.

The fissure of the anus should be treated by laxatives internally, with the view of obviating constipation, or by opiated suppositories, or by astringent enemata, with the sulphate of zinc, $2\frac{1}{2}$ grains to the $\frac{z}{3}$ j; tannin, 5 grains to the $\frac{z}{3}$ j; extract of rhatany, 4 grains to the $\frac{z}{3}$ j.

M. Trousseau has observed some instances of this disease, which he treated by rhatany, his usual practice.

The first case was that of a girl, one year old, of good general health, subject from her birth to constipation, which has particularly increased during the last four months. The child only goes to stool once every three or four days, and utters sharp cries at the time of each defæcation. The pain appears to commence with the effort of defæcation, and to be very acute during the passage of the fæcal matters through the anus.

About a month since, the constipation becoming a little more obstinate, defæcation is still more painful, and at each stool the child passes several drops of blood, which are expelled either before or after the fæces, but are never mixed with them.

The circumference of the anus is perfectly healthy; but on widely separating the folds, there appears, at its anterior part and between two folds, a fissure of about one-sixteenth of an inch broad and about one quarter of an inch long, rather deep, of a red colour, and much more easily perceived when the child, crying violently, strained as if at stool. The constriction around the anus is such, that the extremity of the finger can scarcely be introduced.

Some days after the cure of this child, M. Trousseau had under his care a little boy, eight months old, who, from being weaned too early, was seized with a very violent diarrhœa, immediately succeeded by a very obstinate constipation.

This state had lasted for eight days, when the child was seized during defæcation

with a most acute pain. The fæcal matters on that day were slightly tinged with blood.

From this period, at each stool, the child is seized with very acute pain during the efforts of defæcation, and each time a small portion of very pure blood tinges the fæces without mixing with them.

On examining the anus, a slight erythema is observed, mixed with eczema nearly well, and the existence between two folds of the anus of a fissure about one-eighth of an inch broad, and less than one-sixteenth of an inch in length, not very deep, of a reddish colour, and which becomes perfectly developed when the child makes an effort of defæcation. The anus is also the seat of a considerable constriction.

In these two little patients, M. Trousseau prescribed:

Extract of rhatany	15 grains.
Water	℥ iij.

For an enema every day.

This treatment had wonderful success, and effected the cure in the little girl at the end of eight or nine days, and in the little boy, at the end of three days only.

BOOK XI.

ON DISEASES OF THE PERITONÆUM. ON PERITONITIS.

Peritonitis, or inflammation of the peritonæum, is a very common disease amongst newly-born children. It has been described by Billard, Dugès, and more recently by M. Thore, in a work of which I have a very high opinion.

Causes.

Peritonitis is sometimes developed in the fœtus whilst still enclosed in the womb of the mother, and it constitutes *congenital peritonitis*. Billard, Dugès, and Simpson have related numerous examples of it.

Peritonitis most usually manifests itself after birth, and during the first month of existence. It is more rare amongst children of a more advanced age. Its appearance often coincides with the existence of epidemics of *puerperal fever*. It is sometimes developed in a *primary* manner without any appreciable cause, and without any anatomical lesion in the neighbourhood of the peritonæum accounting for its presence. Most usually the peritonitis is *secondary*, and results from the erysipelas of infants, and from the umbilical phlebitis which follows

ligature of the cord; from an obstacle to the progress of the fæcal matters in the intestine by constipation, imperforation of the anus, intestinal invagination or inflammation of a hernial sac; from rupture of the bladder, laceration of the liver, perforation of the stomach, general eczema, &c. In all these cases we may admit that the inflammation has been communicated to the peritonæum by the lesions of the surrounding parts above alluded to.

Peritonitis is nearly as frequent amongst boys as amongst girls, and is developed in all seasons, especially in spring and summer, but without any well-marked influence of the external temperature.

Anatomical Alterations.

Under the influence of the various causes above enumerated, the peritonæum becomes at first the seat of a more or less decided capillary injection, at the situation of the abdominal walls, and at the inferior surface of the liver, in the case of umbilical phlebitis, or in the other parts of the peritonæum near to the cause of its inflammation. Sometimes this redness is general, and exists alone without any other lesion of the peritonæum. False membranes, of a variable consistence and thickness, often accompany this tinting, and this effusion of plastic lymph serves to establish more or less numerous adhesions between the different intestinal folds. The peritonæum is, moreover, sticky and glutinous. It encloses a viscous sanguinolent or purulent serosity, in a quantity varying from one to seven ounces. At a later period these adhesions are more compact, more resisting, and, after the cure of the peritonitis, have the same appearance as that of other old serous inflammations, that of vascular filaments converted into cellular bands. Billard has observed this in two newly-born infants who were attacked with peritonitis in their mother's womb.

According to M. Thore, peritonitis often exists with pneumonia, sometimes with pleurisy without effusion, and with pericarditis; but these lesions are consecutive to the peritonæal inflammation.

Symptoms.

The peritonitis of infants is usually observed in the *acute*, and very rarely in the *chronic form*. In both cases its symptoms are very obscure, and the diagnosis is often only established on the table of the amphitheatre, that is to say, after death. This is readily understood, for peritonitis is very often a *secondary* disease, and is developed as a consequence in the course of other diseases which mask its commencement by their proper symptoms.

When, however, the patients are narrowly watched, and when, on daily examination, the abdomen is felt, in order to appreciate its state of suppleness, it is discovered to be the seat of a very acute pain

on pressure, and to be greatly stretched and swollen; this is sufficient to give warning, and to lead us to search if there are not other phenomena of peritonæal inflammation. Dugès and Thore have alluded to the considerable projection of the umbilicus in the infant, but this characteristic is no longer observed in the peritonitis developed a month after birth. The children often vomit, and are usually constipated. However, both these symptoms may be wanting, the skin is cold, the pulse small, frequent, often inappreciable. The face does not present the marked alteration similar to the modifications which the features of an adult, labouring under peritonitis, undergo. There is, however, a very apparent alteration of the respiratory movements which seems to indicate their obstruction and the pain which they cause. This characteristic appears to me to be one of great importance. The respiration is *short*, *incomplete*, and irregular; each inspiration, suddenly arrested, appears painful; occasionally a slow and deep respiratory movement takes place in order to make amends for the insufficiency of the preceding respirations.

To recapitulate: pulse small, frequent, often not to be felt; tension of the abdomen, projection of the umbilicus, pain of the abdomen on pressure; sometimes vomiting and constipation; decided change in the external characteristics of the respiration, which becomes painful, short, incomplete, jerking, irregular; these are the most important symptoms of the acute peritonitis of young children.

Case 1. *Acute peritonitis.* Billard relates that Alexis Sonnecourt, fourteen days old, strong and vigorous, has had œdema for two days, has vomited all that has been given him, and has become very pale.

The appearance is anxious, the child continually restless. The abdomen is swollen and forms a projection towards the navel; it is hard and very painful to the touch, for as soon as pressure is exercised, the child utters a cry, becomes flushed, and breathes with the greatest difficulty. The chest is resonant throughout; the skin is dry and burning, the pulse cannot be felt at the wrist, and the pulsations of the heart under the stethoscope are deep and obscure; the cry is small, feeble, sharp, and scarcely to be heard; there is no alvine evacuation. Diet, sugared water, poultice to the abdomen; baths.

The child died three days after the commencement of the symptoms. On the examination the next day, the mouth, œsophagus, and stomach were observed to be healthy. The intestines were distended by a large quantity of gas; the peritonæum did not present any redness in the different points of its surface, but recent and yet rather firm adhesions existed between the intestinal convolutions and a rather thick pseudo-membranous layer on the mesentery, and about two ounces of a sero-purulent liquid were effused into the peritonæal cavity. The organs of circulation and the brain were healthy.

Case 2. *Acute peritonitis.* A boy, four months old, born of a mother infected with syphilis, having itself coryza and general syphilitic eczema, was admitted into the Necker Hospital.

This child was treated by topical applications, and it was nearly cured when it was seized with pulmonary catarrh with considerable dyspnœa, and a very peculiar

obstruction in the external movements of respiration. These movements were *short, incomplete, jerking*, and appeared painful; they regularly succeeded each other, and at the end of eight or ten inspirations, a slow and deep inspiration came on, capable of supplying the insufficiency of the preceding respirations. The abdomen was very tense and swollen; the skin very hot, the pulse very small and very frequent, 160 pulsations in the minute. There were no vomitings, and the stools were regular.

The child died; it had an acute peritonitis with sero-purulent effusion and false membranes on the intestines. There were several nuclei of lobular pneumonia.

Case 3. *Acute peritonitis.* At the Necker Hospital, in a boy six weeks old, following one of those cases of erratic erysipelas so serious at this age, peritonitis appeared with swelling and pain of the abdomen; smallness and frequency of the pulse, 170 to 180 a minute; an obstruction to the respiration exactly similar to that just described, and there was in addition a plaintive groan very evident at each expiration.

There was neither nausea, vomiting, nor constipation. The face, although changed, did not present the sharp appearance observed in the peritonitis of adults.

The child died; there was a considerable serous effusion in the abdomen, some false membranes on the intestine, and a great number of these products on the superior and inferior surface of the liver.

Such are the symptoms of acute peritonitis; as to the symptoms of chronic peritonitis, they are very difficult to make out; indeed I have never met with it in young children, and there is only one case of it published. It is related by Billard. It is a case of chronic peritonitis consecutive to inflammation of the intestine which resembles analogous cases well known at a more advanced age.

The swelling of the abdomen, diarrhœa, efforts to vomit, obstruction to the respiration, smallness of the pulse, marasmus, and feebleness of the cry, were the symptoms observed during life.

The peritonæum was the seat of numerous adhesions and contained more than two ounces of a yellow and turbid serosity. The small intestine was injected, and in the colon numerous *slaty* streaks were observed, the traces of an old inflammation of this intestine.

The acute peritonitis of young children usually makes very rapid progress and terminates fatally in twelve, twenty-four, or thirty-six hours. It is the exception when it lasts a longer time.

The prognosis of the peritonitis of infants is extremely unfavourable. In the town as in the hospital, nearly all the children die. Some however recover, as is proved by the fact that in some autopsies, bands are observed round the intestinal folds which are evidently the result of old inflammations of the peritonæum terminating in recovery. For my part, I am of opinion, that in these cases, these adhesions are the result of latent inflammation of the peritonæum developed around a deceased viscus, for I cannot believe in the cure of a true acute peritonitis of any intensity.

Treatment.

Notwithstanding the unfavourableness of the prognosis, the practitioner should not remain inactive in a case of acute peritonitis. It is a disease which must be treated as if we were sure of curing it, or at least in the hope of bringing about the recovery.

Lactation should be suspended, and nothing given to drink except gum water slightly opiated. One or two leeches should be applied on the abdomen around the umbilicus, the child should be put into baths of bran and marshmallow, and poultices applied on the walls of the abdomen. If the child is so weak as to lead to hesitation about the application of leeches, they should be immediately replaced by a thick layer of mercurial ointment, or what is better still, by a large flying blister on the abdominal wall; it is even the best means to be employed. If the child does not pass any motion, a few grains of calomel may be given, or the syrup of chicory, or slightly purgative enemata. These means are not suitable when diarrhœa leads to the suspicion of the existence of enteritis.

Ascites.

[Dr. Wolff (*Analek über Kinderkrank;* 1837) has met with above one hundred cases of dropsy in his own practice during six years; the children attacked with it were, in most instances, between the second and fifth year. It is usually ushered in by general indisposition with loss of appetite, and an irregular state of the bowels. The tongue is slightly furred, and the patient suffers from occasional pain in the abdomen, with some degree of fever and acceleration of pulse. After the lapse of from five to fourteen days, during which it often happens that drastic purgatives are given to the child under the supposition that it is suffering from worms, the pains become constant, the febrile symptoms more strongly marked, the loss of appetite is complete, the abdomen grows tumid and on a careful examination yields a distinct sense of fluctuation. Among the symptoms of the disease Dr. Wolff attaches considerable importance to a peculiar tumidity about the root of the nose, and the value of this sign is confirmed by Professor Nasse. This form of abdominal dropsy does not reach so great a degree as is often attained by ascites in the adult, and it is never associated with œdema of the extremities. Hence its real nature may be overlooked. If, however, the disease be left to itself, the extremities of the child grow emaciated by degrees, till at length the skin hangs around them in folds; fluctuation becomes gradually more obscure without any diminution occurring in the size of the abdomen, the patient's strength fails, universal emaciation takes place; the bowels are now purged, now constipated, irregular accessions of fever come on, and the little sufferer pines away into its grave.

In the early stage, leeches are to be applied and small doses of calomel given; as it assumes a more chronic form, calomel and digitalis, and digitalis and cream of tartar are to be carefully administered.

Acute ascites: M. Trousseau (*Gazette des Hôpitaux;* No. 100) has recently called attention to a form of acute ascites in children, which, according to his experience, is by no means rare. In a case referred to, only four days before the child was brought to the hospital, it was in complete health. After only

very slight pain in the belly, this became swollen; and on admission, a large quantity of fluid, causing dyspnœa, was detected; no fever being present, and the digestive organs continuing in a normal condition. These cases are exactly analogous to those of acute hydrothorax depending on pleurisy, as these do on peritonitis—a pleurisy, however, in which the effusion is so great and so rapid, that death ensues if paracentesis thoracis be not resorted to. There is the same difference between acute febrile peritonitis (almost always fatal) in which the inflammatory symptoms are violent and the effusion small, and the peritonitis with little fever and much effusion, as between acute febrile pleurisy and acute hydrothorax. In hydrothorax, however, we can remove the mechanical obstruction to respiration by paracentesis, which is a harmless operation; but in this form of ascites, though the prognosis is as favourable, our procedure must be different. In fact, the experience of M. Trousseau and his colleagues is entirely unfavourable to paracentesis abdominis in children—the operation almost always terminating fatally. Even in the adult, the repeated tappings which sometimes take place are usually performed on women, and are in fact, operations on ovarian cysts, and not upon the peritonæal cavity. In men, as in children, it is the peritonæal cavity itself that is opened, and the prognosis is much more unfavourable. In the child, when it is not complicated by tubercular disease, the treatment of this ascites is best accomplished by giving small doses of calomel, until the gums are slightly swollen, and keeping a hemlock cataplasm applied to the abdomen day and night. If resolution does not quickly occur, the surface of the abdomen should be painted with iodine.—P.H.B.]

BOOK XII.

ON DISEASES OF THE LIVER.

1st. On the Jaundice of Infants.

Jaundice is a phenomenon which is very frequently observed amongst the newly-born, and which has up to the present time been described as an essential disease. This is a mistake. The jaundice of infants always results from a slight or severe inflammatory affection of the liver which obstructs the circulation of the bile and causes its passage into the blood. We shall not, then, describe icterus as a special disease, but rather as a symptom of the organic alteration of the liver, and principally as a symptom of acute hepatitis.

[M. Bouchut is probably incorrect in his statement that icterus always results from an inflammatory affection of the liver; in many cases it appears most likely due to the *passive state of congestion* so frequently observed in the liver of new-born children, to which Billard drew attention some years ago, and also stated that such a condition would, in most cases, only be known after death, as during life it afforded no special symptoms for its diagnosis. In Bednár's late

work (*Op. Cit. Dritter Theile ;* p. 133) it is also laid down that it is impossible to diagnosticate hyperæmia of the liver, if it be uncomplicated with increase of size of the organ.—P.H.B.]

2ND. ON ACUTE HEPATITIS.

Hepatitis is the term given to inflammation of the liver. It is a very frequent disease in the newly-born infant, a few days after its birth. One third of the children who come into the world are affected by it, and up to the present time it has been described under the name of its principal symptom, which is *jaundice.*

The hepatitis of infants may be the result of compression of the body of the fœtus in the process of accouchement, or of contusion of the liver at the moment of parturition. It may be brought on by the impression of the external atmosphere on the skin, and especially on the general and cutaneous circulation. Lastly, as I have several times observed, it is the result of the umbilical phlebitis which succeeds the ligature of the cord, and which extends from the umbilicus, where it originates, to the veins of the liver. It has also been observed in the course of enteritis and sclerema.

[According to West, the icterus of new-born children is generally a trivial affection, not usually dependent on intestinal disorder, but on imperfect performance of the functions of the skin and respiratory organs. In the Dublin Lying-in Hospital, where the children are defended by the most watchful care from the evils either of cold or of a vitiated atmosphere, the occurrence of infantile jaundice is rare; while at the Foundling Hospital, at Paris, jaundice is so common that few infants escape it—for almost all of them have been exposed to the action of cold and bad air while inmates of it—causes which interfere very seriously with the due performances of the functions of the skin and of the respiratory organs.

Sometimes, however, it is a very serious affection, dependent on congenital absence of the hepatic or cystic biliary ducts, or on the obstruction of those ducts by inspissated bile; these cases are remarkable as being characterized by a tendency to hæmorrhage, which takes place most frequently from the umbilicus, either before or soon after the separation of the funis, and speedily prove fatal.

Two cases of infantile icterus have lately occurred, caused, according to Mr. Lee, by the non-closure of the ductus venosus. "The greater part of the blood from which the bile is secreted, instead of passing through the liver, is transmitted directly to the heart. As this open channel affords a much more ready passage for the blood of the portal vein, than the complicated circulation through the liver, it is probable that nearly the whole of the blood from the portal vein passed to the general circulation in this way. These would then be available for the purpose of the secretion of the bile, only the small quantity which would find its way through the portal circulation in the liver, and the blood sent to the liver by the hepatic artery. The quantity of blood from which it would be possible that the bile could be secreted, would be thus very much less than natural, and the necessary consequence of this would be, that the bile would accumulate in the system, as in fact it was found to do in the two cases which have been read." One of these cases was attended by uncontrollable hæmorrhage, and in the other, in which erysipelas and purulent deposits occurred, the umbilical vein was found distended

with a curdy puriform fluid, which extended into some of the subdivisions of the vena portæ in the liver.—(*Med. Times and Gazette ;* p. 333, 1854.)—P.H.B.]

The liver then is very swollen and gorged with black liquid blood. The vessels of the liver as well as those of the abdomen are filled with it; there is even sometimes an exudation of this liquid into the gall bladder and sometimes into the duodenum. The bile is a little yellow and more abundant than usual, for it is known that in the newly-born, the bile, instead of being yellow, is, on the contrary, of a very deep, blackish, green colour.

The tissue of the liver is granular, bluish red, always a little softened, and often adherent by means of false membranes; it sometimes contains small abscesses in its interior, but only in cases of severe hepatitis. Baumes, and Dr. Martin of Lyons (quoted by Richard), have related several cases of it. This last has observed not only abscesses in the liver but also other purulent collections in the scrotum, palm of the hands, and muscles, indeed all the characteristics of purulent absorption. It is a matter of regret that in these cases Dr. Martin has not paid sufficient attention to the state of the umbilical vein.

This vein sometimes presents unequivocal traces of inflammation; it is filled with a soft clot, slightly adherent and separated from the walls by pus. In many cases even the suppuration exists in the sheath of the vessel and is observed beneath the peritonæum and the abdominal wall.

The skin is yellow, as is also the cellular tissue and the subcutaneous adipose tissue. The colouring extends to the deep organs, the intestine, the internal muscles, the bones, the heart, the spinal cord and brain, &c., which is not to be wondered at, since the icteric suffusion is general. On this point there are only differences of degree; if the jaundice is but of slight intensity, it exists chiefly in the superficial and vascular parts, as the skin; when it is more considerable it is everywhere observed. However, it is said that this is not always the case, and they pretend to have seen, what I have not met with myself, local jaundice, jaundice of the deep parts, and of one organ in particular, without jaundice of the skin; thus, Billard states that he has twice observed the yellow colour of the fat in newly-born children, and he adds, that when the thigh was incised transversely, the incision of the stump presented a circular yellow line, situated in the subcutaneous adipose tissue, whilst neither the skin externally, nor the muscles centrally, were tinged yellow. Before this dissection there was no suspicion of the child being jaundiced. The periosteum and the tissue of the bones have also been observed of a yellow tint, with or without general jaundice.

It is impossible that Billard can be deceived as to the phenomena which he relates, and we may accept, on his testimony, what he

observes on the yellow colour of certain tissues without general jaundice, but there is probably some mistake in the interpretation of the facts. Local jaundice is so foreign to the laws of pathology that it is difficult to accept it as a true jaundice; we do not understand it, for then this disease does not consist in the passage of the colouring matter of the bile into the blood. It is probable that Billard has been the dupe of his senses, and that, guided by a simple phenomenon, the yellow colour, he has met with diseases of an entirely different nature, and that he has referred to jaundice local alterations of colour in certain tissues, alterations independent of the affection we are now considering.

Symptoms.

The acute hepatitis of infants presents itself under two distinct forms, the one *common* the other *malignant;* the first is feeble and slight, the other, on the contrary, is very serious and very intense.

Acute feeble hepatitis, or *common hepatitis*, is developed amongst one third of children shortly after birth. It is announced by a yellowish colouring, which is mixed with the red colour of the skin common to all new-born children, and thence becomes difficult to be distinguished. The skin is of a reddish yellow, and if the finger is applied on the surface instead of becoming white it becomes yellow under pressure, and immediately assumes the reddish tint again. At a later period, at the end of two or three days, the jaundice is very apparent, the red colour of the skin vanishes, and the icteric tint remains.

This colour exists in other places besides the skin. It is also observed on the conjunctivæ, on the inferior surface of the tongue, and in the urine, which we cannot collect, it is true, but it gives to the linen a characteristic yellow colour. The fæcal matters preserve their appearance, and do not become at all greyish as in the adult.

The abdomen is slightly tense and painful over the right hypochondrium, pressure causes pain, and the liver extends beyond its limits laterally. The skin is moderately warm, the pulse from 110 to 120, the digestive functions are otherwise in a very good state.

At the end of six or ten days the yellow colour begins to disappear, to give place to the natural rosy tint of the skin of young children.

Common hepatitis and the jaundice which accompanies it are distinguished from the *physiological yellowish colour* of the skin of the newly-born, by the yellow colour being much more decided, much more general, and observed at the same time on the conjunctivæ and on the buccal mucous membrane in the jaundice of hepatitis, whilst this is not the case in what is termed the yellowish colouring of the skin of the newly-born.

This form of hepatitis is not at all serious, and its progress is never obstructed by important symptoms.

Treatment.

Common hepatitis, or, as some call it, the icterus of infants, should be treated by tepid baths, either simple or aromatic, for one half hour, and repeated once or twice a day. Slight frictions should be made with spirits over the abdomen and the region of the liver. The children should also be wrapped in flannel. These means are sufficient to cause the disappearance of the disease in a few days.

When it is accompanied by enteritis or sclerema, the medicines recommended in the chapter devoted to these diseases should be made use of.

On Malignant or Severe Hepatitis.

This second form of acute hepatitis is more rarely met with than the preceding, and most physicians have probably never observed it; Baumes, Richard de Nancy, Martin of Lyons, and Heinke, have related some cases of it.

Grave or malignant hepatitis becomes developed under precisely the same conditions as common hepatitis, only its anatomical lesions, progress, and fatal termination separate it in an absolute manner, to the same extent as we must distinguish common variola, scarlatina, and measles from malignant scarlatina and variola, &c.

Here, as we have previously remarked, the anatomical lesion is no longer simply a general icterus with sanguineous congestion of the liver, accompanied with hypertrophy of the organ, which takes place in common hepatitis; there is, in addition, considerable softening, and partial decoloration of the hepatic lobules, and here and there collections of pus disseminated in the lobes of the liver. Baumes, Richard, and Martin of Lyons, have, as I have before observed, reported several instances of multiple abscesses of the liver, with or without abscesses in other regions of the body.

In this last case it is very probable that the hepatitis is the consequence of umbilical phlebitis, and that the disseminated abscesses are the anatomical manifestation of purulent infection.

Newly-born children attacked with malignant hepatitis are feverish; their face is flushed, the skin of the body warm, red, yellowish, then completely yellow; the conjunctivæ and the under surface of the tongue yellowish, the urine highly coloured with yellow, tinging the linen. The jaundice is always perfectly evident.

The abdomen is hard, tense, painful at the right hypochondrium, and the swollen liver much exceeds its limits. The children have nausea, sometimes reject reddish matters, and void an abundant meconium, of a dark colour, or only a meconium discoloured yellow. According to Heinke, these matters are often grey, which seems to me to be opposed to the result of all observers.

The respiration is laborious, hiccough frequent, and as M. Richard has pointed out, when this state increases or is prolonged, a profound alteration in the features comes on; the eyes become fixed, some convulsions are manifest in the face and muscles of the limbs; the child falls into a collapse, becomes cold, and dies.

Sometimes this form of acute hepatitis is accompanied by erysipelatous redness of the skin, subcutaneous inflammation around the situation of the insertion of the cord, and on different parts of the body; aphthæ and purulent ulcerations on the lips, commissures of the mouth, eyelids, and at the orifice of the prepuce and the anus. Sometimes indeed these various inflammations terminate in gangrene.

Malignant hepatitis causes the death of the children in some days; I am not aware, at present, if any recover from this disease. It is then a serious disease and possessing a most fatal prognosis.

If the children are strong and vigorous, we might then perhaps apply one or two leeches at the region of the liver, taking the precaution of very speedily arresting the flow of blood. I should prefer prolonged and repeated tepid baths twice a day, fomentations, poultices, oily and purgative enemata; in order to arrest the vomitings, cold water, pure orange flower water by teaspoonfuls, one drop of laudanum every hour, and lastly, a flying blister over the region of the liver.

In case of abscesses of the skin, and gangrenous inflammations of the cellular tissue, the collections of pus should be opened early, they should be carefully washed, cleaned with aromatic wine, tincture of bark, or a solution of the chloride of soda, and they should be covered with powdered cinchona, and dressed with ointment and with styrax so as to promote cicatrization.

3rd. On Chronic Hepatitis.

A chronic hepatitis of the newly-born has also been alluded to, and Burns has given a description of it, but the facts which this author reports are very incomplete, and cannot, at present, serve for a history of this disease. I have not myself observed it, for it is very rare, therefore I shall abstain from describing it in detail. However, it is perhaps to this affection that certain particular lesions of the liver, vaguely indicated by ancient authors as appertaining to syphilis, and very well described, quite recently, by M. Gubler, with this qualification, must be referred. Apart from his interpretation, the fact exists, and amongst several infants tainted with congenital syphilis, the liver is considerably changed, unequally indurated and discoloured, yellowish and infiltrated by a quantity of the elements of fibro-plastic tissue, more numerous than those of the normal state. It is a profound alteration, always of long standing, and which may be very properly looked upon as a chronic venereal hepatitis. The description of it will be reserved,

and further on it will be found in the chapter devoted to the syphilis of infants.

4th. On Traumatic Hepatitis.

This is a form of hepatitis entirely different from that just described. It is observed in every age; and in our country, with our temperature, saving the cases of purulent infection, abscesses of the liver are usually the result of contusions of this organ. Here is a case observed by M. Renaud, in a child sixteen months old. The hepatitis was caused by a contusion over the right hypochondrium, it was followed by the formation of an abscess which opened externally and ended in the death of the child.

Case. Abscess of the liver opening externally in a child sixteen months old, by M. Renaud. Called on the 27th of March last to a child sixteen months old, which I learnt had been ill for six weeks, having at that time had a fall from a height more than three feet, receiving a violent blow on the right hypochondrium. Previous to this time it enjoyed very good health; but at the decline of the day of its fall, the physiognomy expressed a continual suffering; it gradually dwindled away. However, the parents, in their culpable negligence, never had recourse to medical aid; they only thought they observed the formation of a tumour which appeared extraordinary to them. The information obtained at the time of my first visit, on the first symptoms experienced by my little patient, is not sufficiently precise to be transmitted here; but I positively ascertained that the child had never had jaundice, nor any derangement referable to the digestive functions.

On December 27th, the child presented a decubitus on the right side; out of the cradle it inclines towards the right side, the position which it preferred from the day of the accident. The skin is pale, dry; the respiration anxious; the pulse small, accelerated. The maternal milk is taken on each occasion with avidity; the alvine excretions are yellow and of natural consistence; no vomiting. The abdomen large, indurated, presents on the right hypochondrium a considerably flattened, fluctuating, pulsative tumour.

On the 1st of January, 1851, after a slight exploratory puncture, I made a sufficient opening, and an enormous quantity of phlegmonous pus escaped from the interior of the tumour, which collapsed.

4th. The flow of pus has always been abundant; the skin which covers the tumour is thinned; at several points fistulous tracts are observed.

5th. The skin adheres to the poultice, and presents a white surface covered with purulent matter. The wound is circular; it appears as if made with a punch; its dimensions are $2\frac{1}{4}$ inches by $2\frac{1}{8}$ inches.

7th. The membranes which cover the convex surface of the liver are gangrenous; I removed them. The tenth rib forms a projection of one eighth of an inch in the interior of the wound, and offers resistance to the hepatic gland, when this is carried outwards in the act of inspiration.

8th. The surface of the liver presents a greyish tint; an ulceration has formed on the part compressed by the rib.

9th. The rib is laid bare in its projecting portion; it appears to me floating between the abdominal wall of the liver, simply retained by the vertebral extremity, and attacked with necrosis.

11th. The liver fills up the circular opening, at the superior part of which it presents a notch of 1.2 inch in length and .4 in depth. The pus, always abundant, has become fœtid, mixed with the detritus of the hepatic tissue.

15th. The dressings are impregnated with unaltered bile, the escape of which lasted until death. This child is in the most extreme state of marasmus and debility possible; it is seized with hiccough, the face is pinched, the skin of a well marked pallor, the pulse filiform and accelerated. Nevertheless, no disturbance was observed referable to the digestive tube. To the internal treatment, which consisted of cod-liver oil and syrup of bark, a little broth and sweetened wine were added. Death occurred two days afterwards.

MM. Gros, Oviou, and Duhamel assisted at the last stages of this truly rare and interesting disease, and also at the autopsy, which the opposition of the parents rendered incomplete. We remarked adhesion of the liver with the abdominal wall, by means of extensive pseudo-membranes, which were covered with pus; a cavity situated on the superior and external portion of its convex surface, capable of holding a large nut; the walls of this cavity were indurated, of a whitish colour, from one fifth to one fourth of an inch in thickness; the surrounding tissue of the liver bluish and indurated; at a distance of 1.2 inch the organ presented the normal texture, but in its inferior and external third many small deep-seated abscesses were observed.

BOOK XIII.

ON DISEASES OF THE KIDNEYS.

CHAPTER I.

ON ALBUMINOUS NEPHRITIS.

Albuminous nephritis is an organic affection of the kidneys, accompanied by albuminous urine. It is a very frequent disease in the adult, and one well known since the investigations of M. Rayer. It is sometimes observed in young children, but the fact is rare, and it is not without use to support it by some proofs.

This disease is announced by decoloration of the integument, œdema of the feet and hands, swelling of the abdomen, in consequence of an abdominal serous effusion, puffiness of the countenance, and lastly, by the passage of blood or of albumen into the urine.

This change in the urinary secretion is detected by the addition of several drops of nitric acid to the altered urine, and boiling it in a small glass tube. A whitish granular precipitate reveals the presence of the albumen, which has become solid under the influence of the reagents.

M. Rayer has observed many children from six months to one year old already affected with this disease, and has given me for investigation the bloody and albuminous urine of a child nine months old. M. Nöel has communicated to me the case of a child of eighteen months, who became bloated during the course of chronic enteritis, and whose urine gave a precipitate by nitric acid and heat; it died after several months of suffering. M. Grisolle has seen an instance of it in his practice at St. Antoine Hospital; and this case is one of the most curious, for the albuminous nephritis, in a child of some weeks, only occasioned transient symptoms of dropsy not followed by death. The following is the case:

Case. Charles Désiré, a boy living Rue St. Pierre, five weeks old, born at the Maternité, was admitted the 13th of December, 1849, into the St. Antoine Hospital.

The mother has been in good health since her confinement; there was nothing particular in the delivery. She has commenced to suckle her child; from the second day she had little milk. Her child was large and well developed at the moment of birth.

The mother left at the end of eleven days from the delivery, and lived in a furnished apartment, where she suffered from cold and hunger. She found herself indisposed, was seized with shiverings; the lochiæ were suppressed, were replaced by fluor albus, and she entered the hospital as much for herself as for her child, who had an ophthalmia.

The night previous, the mother having left her child alone in a room without a fire for several hours, found him on her return *stiff* and *blue* with cold.

The day of her admission into the hospital, she remarked that her child had a swelling of the left hand. Little notice was taken of this local œdema. It was not until after several days that having noticed that the child got thinner, dwindled away, and that he had become emaciated; he was undressed, and it was remarked that the whole of the left pelvic region was the seat of a soft, whitish œdema, which extended as far as the left region of the scrotum.

The urine is slightly turbid, of a deep lemon colour, with a considerable precipitate on the addition of nitric acid.

The next day, the same trial with the same result.

January 3rd. Iron reduced by hydrogen, sixteen grains for two doses.

From the 5th to the 13th, the œdema which is soft, easily gives way under the finger which leaves an impression lasting one or two minutes; it is variable in its intensity and situation, sometimes predominating in the hands, sometimes in the limbs and scrotum. It has been present for twenty-four hours at the chin and eyelids.

No fever, respiration natural, a little cough.

13th. Œdema much less.

The urine is quite colourless, slightly mucous. No precipitate on the addition

of nitric acid; boiling heat communicates to it a very slight opaline tint without flakes.

16th. There is no œdema except on the dorsal surface of the feet. The child has recovered; he is less emaciated.

25th. No reappearance of the œdema. Abundant perspirations for several days. Urine unaffected by the acid or by heat.

29th. The child is more lively, his cry stronger; he has always been somewhat emaciated. Disposition to rickets. Omit the iron. Two tea spoonfuls of cod-liver oil.

Februrary 3rd. Urine unaffected by the reagents.

5th. The same.

15th. The child has increased in flesh; the œdema has not reappeared.

April 2nd. Visited the mother of the child which has quite recovered and become fat, but which was carried off some days afterwards by a convulsive disease.

Note. The urine was at first obtained by the mother, who undressed the child in the cold, and quickly carried him to the utensil; the child passed water.

More lately, this means having failed, the parts were enveloped in a belt.

Here, moreover, is another case which I have myself observed in a child of more advanced age, ill in consequence of pulmonary and cerebral tubercles.

Case. Tubercles of the lung, bronchial glands, meninges, and kidneys; meningitis, cerebral softening, albuminuria. A girl twenty-seven months old, has her twenty teeth, of general good health; had diarrhœa and fever each time that she cut a tooth.

She had been four months in the hospital, St. Therèse Ward, No. 11.

The twentieth tooth has just come through; she had fever and diarrhœa for some weeks; she had an eruption on the lips.

She had then inflammation of the eyes for some time.

She had afterwards a catarrh which became developed into hooping cough at the end of some days.

A pneumonia on the left side caused it to cease; then it reappeared and has continued until now. She had an attack of fever each day.

Since eight days, the attacks have ceased, the fever has assumed a continued type, and the abdomen is painful. The cough is small, dry; nothing can be discovered on the examination of the chest.

To-day, 29th of November, 1841. She is in the following state:

Depression, somnolence; the eyes are continually closed, general resolution. Skin warm, face injected; pulse 142.

Cough dry, unfrequent; nothing abnormal can be discovered on the chest; respiration puerile posteriorly, a little sibilant râle anteriorly.

Abdomen large, apparently indolent; several stools; *urine turbid, albuminous.* The liver is of very large size.

30th. The prostration continues. Yesterday evening this child had a fainting fit; afterwards ground the teeth and bit the fingers. Cough unfrequent, dry; nothing abnormal on the chest. The belly is always hard; bowels relieved twice. Tongue red, dry; lips dry. Skin warm, pulse frequent, 142.

Gruel, milk.

31st. In the same state. The weakness increases when it is endeavoured to lift the child. She feels very ill. Dorsal decubitus; the eyes closed; complete resolution; pulse 136.

Gruel, two calomel pills.

February 1st. Two attacks of loss of consciousness; muttering, grinding of the teeth, slight convulsive movements of the arms and legs. The right pupil is more dilated than the left, the head is thrown back, and the child is at once entirely raised by lifting the back of the head. Considerable fever in the evening; this morning the skin is natural. Digestive organs healthy; no vomitings, two stools; pulse 136.

Gruel, three calomel pills.

2nd. Two stools; muttering, convulsive movements of the arms and legs. Diminished sensibility in the arms, which she can draw back. The same irregularity in the pupils; general stiffness, no injection of the eyes; drowsiness, dorsal decubitus, head inclined to the right side. Skin warm; occasionally the head very intense; pulse regular, 140. Trismus, respiration irregular, intermittent, sighing.

3rd. Convulsive movements of the limbs; trismus, strabismus. The weakness of the limbs on the left side has slightly disappeared. The eyes are open, but vision is lost. Same state of respiration. Several consecutive inspirations and a long pause. Skin very hot; pulse 200 to 220. Less general rigidity.

Died at eight o'clock.

The lungs sprinkled with gelatiniform miliary tubercles. Some of them are observed in the midst of red, hard, and evidently inflamed lobules. There is posteriorly, on both sides, a slight degree of hypostatic pneumonia. The bronchial glands are for the most part tuberculous; they enclose a yellow hard matter, precisely similar to Indian chestnut paste.

The membranes of the brain are considerably and uniformly injected; there are no adventitious membranes. The arachnoid is dry, thick, and opaline at the base. The adhesions of the fissure of Silvius are internal; they also exist at the anterior part of the great central fissure. On the convex surface of the hemispheres, as much to the right as to the left, five of the small white specks called tubercular granulations are observed.

The arachnoid and the pia mater of the base of the brain and of the anterior part of the cerebral fissure are opaque and considerably thickened. On incision they are hard and resisting; it was said they were infiltrated with tubercular matter; it is possibly concrete pus.

The grey substance of the brain appears more injected than is usual, and presents a transparency like agate.

The white substance is slightly injected, firm at the superior portion of the hemispheres.

The superior wall of the ventricles possesses the natural consistence, but the inferior wall, the optic thalamus, the ancyroïde cavity, the fissure of Bichat, are quite softened and diffluent, on both sides alike. The fornix appears dense at its superior part, but not at its inferior. There was but slight effusion of serum into the ventricles.

The same changes exists on both sides; no foreign body in the cerebral substance.

The kidneys contain several slightly developed and ill-defined tubercles. Thus only small whitish very opaline bodies are observed in the centre, the tint of which gradually becomes less decided and is lost in the tissue of the kidney. The remainder of the organ appears healthy.

CHAPTER II.

ON DIABETES MELLITUS.

Examples of this disease are still more uncommon in young children than the examples of albuminous nephritis. The following is one, for which we are indebted to M. Hanner, and which has been published in the medical journals. It is a remarkable circumstance and an exceptional one, that in this case the kidneys were remarkably changed, as well as the mucous membrane of the bladder and of the ureter. It is a matter of regret that the author has not given more of the details of this case, and has not especially observed if there was albumen as well as sugar present in the urine:

A child one year old was attacked with diabetes mellitus. The disease was unnoticed until the excessive thirst and the abundant secretion of the urine called the attention of the physician to it. The child drank from $1\frac{3}{4}$ to 5 pints, and passed a quantity of urine which slightly exceeded that of the liquids imbibed.

The urine was inodorous, pale, slightly turbid, sweetish, and contained sugar.

The child was put on an animal regimen, composed of broth and eggs—it appeared to get better, but the symptoms reappeared and it died. The kidneys were twice the natural size, the cortical layer was of a greyish white, marbled with brown and indurated. In its substance small abscesses were observed. The mucous membrane of the ureter and of the bladder was much inflamed.

[This would appear to be a very rare affection in children, for not only has no instance of it come under the notice of Dr. West, at the Children's Infirmary, but Dr. Prout, out of his immense experience in diseases of the urinary organs, states he has seen but one instance of it in a child of five years old, and only twelve in young persons between the ages of eight and twenty, out of a total of 700 cases of diabetes. Of forty-one deaths from this cause in London in 1849, only one died under four years of age.

According to Dr. Prout there is a modification of diabetes occasionally occuring in very young children, to which the attention of the profession was first distinctly drawn by Dr. Venables. There is great diuresis present, the urine frequently containing albuminous matters; in other instances an excess or deficiency of urea exists; and in a few, saccharine matters, more or less perfectly developed, are found. The specific gravity of the urine ranges, according to the form of the malady, from 1.025 to 1.005, or even less. It is generally transparent, and occasionally of a greenish tint. It is often associated with tuberculous cachexia. Dr. West believes that in *simple infantile diuresis*, the disturbance of the functions of the kidneys, is purely secondary and subsidiary to gastric and intestinal disorder. Dr. Prout affirms, that if the affection is neglected or maltreated, it most usually terminates in organic lesion of the kidney. A tonic regimen and treatment is that which is to be recommended, with the use of the salts of iron. According to Dr. Venables, the phosphate of iron is especially useful. Opium is to be given

with extreme caution, and a diet containing more of the albuminous than of the gelatinous principles is to be enforced.—P.H.B.]

BOOK XIV.

DISEASES OF THE GENITO-URINARY ORGANS.

1. Imperforation of the Gland and of the Prepuce.

Imperforation of the gland is sometimes observed in the newly-born. I have seen two cases of it which I treated by incision.

The child does not pass any urine, and after some time becomes agitated and cries much; the gland is the seat of a complete or incomplete inperforation. In the first case it may happen that no trace of an opening in the gland can be observed, or on the contrary there exists at the situation of the natural orifice a groove formed by the agglutination of the lips of the meatus urinarius. In the second case the imperforation is incomplete, and a small very minute opening exists whence a minute stream or some drops of urine escape. The canal is distended by the urine, the penis being in a state of semi-erection when the children wish to urinate.

In order to remedy this defect of conformation, it is necessary to separate the lips of the meatus at the groove which reveals the situation of the orifice by means of a bistoury or a lancet, or by incising in the probable direction of the canal of the urethra, by means of the point of a cutting needle or an exploratory trocar. A tent or small portion of bougie is then introduced into the urethra in order to prevent renewed agglutination.

In the incomplete imperforation it is only necessary to enlarge the opening with a lancet, and to keep the edges separate by means of a tent, breaking down any adhesions which may take place.

The imperforation of the prepuce is more unfrequent than that of the gland. It is either complete or incomplete. In the first case a distention of the skin at the extremity of the penis takes place, presenting a transparent fluctuating tumour formed by the accumulation of the urine.

In this case it is sufficient to excise the extremity of the prepuce which is too long, and simple dressing ensures the cure.

2. On Hypospadias.

Hypospadias is the term applied to a defect in the conformation of the penis in which the orifice of the urethra is not at the extremity of the gland.

Most authors admit four species of it. In the first, the urethra does not extend to the extremity of the gland, but terminates and forms an opening at the base of the frænum of the prepuce on the spot which corresponds to the fossa navicularis. In the second variety, the opening of the urethra is situated near the scrotum, or on a spot intermediate between this situation and the gland. In the third, the scrotum is divided longitudinally, similar to the vulva, at the base of which the urethra opens. Lastly, in the fourth variety, the opening of the canal is observed on the upper surface of the penis, at a greater or less distance from the pubes. Ruysch, Salzmann, Morgagni, and Chopart, have met with instances of it which are distinguished under the name of *epispadias*.

Boyer considers the first variety of hypospadias as rather frequent. According to this surgeon, the urethra does not extend to the extremity of the gland which is imperforate, it terminates at the fossa navicularis and opens at the inferior part of the gland by an oval orifice the size of which varies, but which is always sufficiently large for the escape of the urine, and at a later period of the seminal fluid. This aperture is surrounded by a delicate skin, its circumference resembles a depressed cicatrix, as if there had been an ulcer at this spot; the urine escapes by a jet which is projected forwards when the penis is raised. Nothing can be done to remedy this deformity. Every proceeding that may be adopted will be useless.

In the second variety of hypospadias, observes Boyer, the urethra opens at the inferior part of the penis, immediately in front of the scrotum, or on a spot intermediate between this place and the base of the gland. The penis is neither so long nor so large as in the natural state, and this organ is more or less curved downwards. A case has been observed in which there were along the urethra, on its inferior surface, two openings with callous edges, which, however, contracted like sphincters.

One of these openings was near the gland and was five or six lines in diameter; the other, which was nearer the scrotum, was still larger. Both of these openings gave issue to the urine. The gland was imperforate and the extremity of the urethra closed by a kind of membrane which formed a natural projection when the patient passed urine by the two openings we have just mentioned. In this kind of hypospadias the frænum does not exist; the inferior part of the prepuce is entirely wanting and the gland completely uncovered. A groove, or a kind of large furrow, is observed which extends from the opening

of the urethra to the end of the gland. This is also a deformity against which the resources of art are of no avail.

However, in the case where the urethra opens into the perinæum the remainder of the canal being permeable to the extremity of the gland, as in the exceptional case of Marestin, the following operation may be performed:

The surgeon opens the meatus urinarius, passes a catheter into the bladder in order to draw off the urine, and after having pared the edges of the hypospadias, he reunites them by means of a suture, which is followed by cicatrization. In every case, it is an operation which should not be undertaken in the child, and should only be performed on the adult.

In the third variety of hypospadias, the scrotum is divided into two equal parts, one on the right, the other on the left, very much resembling the lips of the vulva; but on separating them no inequality is observed on the two sides, nor any of the parts which characterize the sex of the female, as the clitoris, the nymphæ, or the opening of the vagina. At the inferior part of this fissure, near the anus, the orifice of the urethra, or the meatus urinarius is observed; the urethra is deficient from this spot to the extremity of the penis. This part, situated above the scrotum, is more or less developed, well or imperfectly formed; the gland is sometimes well-shaped, but imperforate, much resembling a very large-sized clitoris. In some, the frænum exists as well as the prepuce. The testicle can be usually distinguished in the thickness of each of the two parts into which the scrotum is divided, but its volume varies, and it is situated at a greater or less distance from the inguinal ring. The excretion of urine is performed as it is in women. Most of the individuals who are born with this defect of conformation are baptised and brought up as girls, and wear their clothes until they experience the effects of their quality as men; a more attentive examination recognizes the sex, but they are, so to speak, imperfect men. They have sometimes been regarded as hermaphrodites.

This third variety of hypospadias, like the two first, is beyond the resources of art.

3. On Congenital Phimosis.

Phimosis is characterized by the unnatural formation of a prepuce too long and too narrow to be retracted over the glans penis.

As Boyer has remarked, children are almost invariably born with the opening of the prepuce too narrow to allow of its entire retraction over the glans. It does not become dilated until towards the age of puberty. When this opening allows the urine to pass freely, no inconvenience results from it; but if it is too narrow, retention of urine may be

the result; a soft, fluctuating, very large tumour becomes formed under the prepuce, which it is necessary to empty by compression. This part inflames, the internal mucous membrane becomes irritated, and ulcerates, and thence very serious symptoms result to the child, if we do not know how to treat them and to arrest them at once. Here is a proof of this, in this curious case reported by Boyer to the illustrious Chopart:

A child, two months and a half old, had no sign either of penis or of testicles, after its birth there was observed below the symphysis of the os pubis, an oval tumour of the size of a hen's egg, which was ulcerated, red, and very moist at the middle part of its surface. The skin formed a callous swelling around the ulcer. On pressing the circumference of the tumour, a sort of undulation was felt, and drops of serosity oozed from different small openings of the ulcer. This tumour was looked upon as an incurable cancer, which had spread, and destroyed the organs of generation. A more attentive examination showed that it was neither cancerous nor incurable, and that it was only caused by the imperforation of the prepuce, or by the extreme narrowness of its opening; that the serosity which oozed out was urine, and that it was necessary to make, in the centre of the ulcer, an incision which should penetrate into the pouch where the undulation was felt. This incision was immediately made, a little serosity flowed out, but on compressing the tumour, a liquid similar to clear broth escaped. The opening was sufficiently enlarged to lay bare the base of the pouch, and the gland, the surface of which was excoriated, as well as the interior of the prepuce, were discovered. Emollient injections and great attention to cleanliness were ordered. This child, which had not ceased to cry from birth, and was in a state of continual agitation, became quiet and passed water in large quantity without effort. A complete cure was effected by the end of a month. The penis assumed its natural form, and the testicles were discovered in the scrotum.

This case points out the practice necessary in congenital phimosis causing retention of urine. The prepuce should be divided to an extent proportionate to the size of the swelling it forms, if it is distended by the urine, and then the elongated portion should be excised. Simple dressing and fomentations assist the cicatrization of the wound.

Paraphimosis.

[Since 1848, six cases of this affection have come under Dr. Raus' notice, the paraphimosis having existed from twelve to twenty-four hours, and in one instance for thirty-six hours, so that very considerable tumefaction and inflammation of the glans and prepuce were present. Attempts at reduction by Walthers and the other methods proved fruitless, but this was easily accomplished after the application of the following ointment for from twelve to twenty-four hours: Ung. hydr. ciner., ℥½; ext. conü vel. Belladon., ℥ j to ℥ ij. In the case which continued for thirty-six hours, aq. saturni., was also an account of the tumefaction applied for thirty hours, after which the reduction was easily effected.—(*Casper's Wochenschrift*, 1851; No. 21.)

I have always succeeded by adopting the method recommended by South. See his translation of Chelius, vol. ii, p. 350.—P.H.B.]

4. On Hydrocele.

Some children have from the period of birth, and preserve for a variable time after this epoch, a certain quantity of serosity in the tunica vaginalis still in communication with the peritonæum. This constitutes *congenital hydrocele*. It exists in the infant, and lasts to the age of seven or eight years.

The liquid can be forced back into the abdomen, and this is the distinctive characteristic of this hydrocele which is more or less voluminous and translucent.

This variety of hydrocele disappears as the child advances in years, and requires no other treatment than that of topical resolvent applications. We may, in addition, endeavour to retain the liquid in the abdomen by means of a hernial bandage compressing the inguinal opening. This compression, exercised in a continuous manner, always hastens the closure of the communication between the tunica vaginalis and the peritonæum.

This variety of hydrocele has sometimes been operated on by means of incision or by injection. It is improper treatment; for the disease is not at all dangerous, is usually cured by the efforts of nature alone, and it is much better to wait for this result than to run the risk of an operation which is not free from danger.

Amongst other children, the hydrocele is formed after birth, one month, as Underwood has observed it, six months in one of my patients, and twenty-two months in a case by Lefèvre de Villebrune.

The tumour presents the characters of ordinary hydrocele of the tunica vaginalis independent of its communication with the peritonæum. The tumour is voluminous, hard, and transparent, and the liquid, which it encloses in its interior, no longer returns into the abdomen.

If this last fact is well established, we may practise the operation on this hydrocele by *incision*, or by numerous punctures with a lancet, as I have successfully practised, or by the *injection of iodine* as in ordinary hydrocele. This last proceeding should not be made use of in children at the breast, in consequence of the inflammation it excites, and it is much better to wait until a more advanced age is attained before it is had recourse to.

[There is a *congenital hydrocele of the female*, which closely resembles that of the male; in this variety, a swelling is formed by the collection of water in the peritonæal sheath of the round ligament, which passes through the inguinal canal into the lower part of the *labium pudendi*, and is at first returnable, but afterwards not so.—(Sacchi, *in Annali Universali de Medicina;* vol. lvii, p. 437; 1831.)

Congenital hydrocele presents considerable resemblance to inguinal hernia, the consistence of the swelling, its transparency, its more easy or more difficult reduction, its quicker or slower reproduction serves to distinguish it. When symptoms of strangulation exists, the diagnosis is sufficiently embarrassing.

A boy, six years old, was brought to St. Thomas's Hospital, considered to have

strangulated hernia. He has worn a truss for several years; his bowels have not been moved for the last three days; he has vomited several times, but not since yesterday morning; neither has medicine which he then took been rejected, although it has not operated. The right side of the scrotum, as far as the *raphé*, is distended with fluid, semi-transparent and œdematous; its shape flat, and much the form of the testicle; it is firm but indents on pressure of the fingers, and reaches up to the abdominal ring, where it narrows. South could not satisfy himself as to the existence of any rupture, but thought it had the appearance resembling what he should suppose a burst hydrocele might assume. His mother took him away, promising to bring him back; but he never returned.—P.H.B.]

5. On Dysuria.

The term *dysuria* is given to the pain and the very great difficulty which accompany the emission of urine.

Dysuria may be accompanied by retention of urine. It is especially observed in boys in very special cases, at the end of acute diseases. The following is the cause of this symptom. During the continuance of the febrile state, the urine is scanty, it becomes concentrated in the bladder, or it deposits a large quantity of salts which escape at a later period when the urine becomes very abundant. The excess of the salts irritates the urethra, and produces pain and difficulty of micturition.

Each time the children would pass water, they weep and cry out much; they often endeavour to retain it and not to micturate until the last moment, which may bring on a true retention of urine.

Emollient diuretic drinks in large quantities and baths are sufficient to cure this disposition, which never lasts more than several days, and does not present any danger.

6. Occlusion of the Vulva and Urethra.

The *almost complete absence* of the external parts of generation is sometimes observed, they being formed simply by a clitoris, beneath which an opening for the passage of the urine is observed.

In others, the parts are entire and complete. There is simply a *congenital occlusion* of the vulva with or without occlusion of the urethra. This closure may be *accidental*, and is observed in young children consequent upon burns and inflammation or gangrene of the vulva.

If the occlusion also affects the vagina, it does not cause any symptoms unless the epoch of menstruation has arrived. There can, therefore, be none amongst children. In the case, however, in which the anatomical disposition is such that the urine, instead of escaping externally, passes into the vagina, behind the adhesion of the vulva, and there brings on inflammation, urinary concretions, or urinary abscess, the labia majora should be divided, and the parts maintained in a position favourable to isolated cicatrization.

If the *occlusion of the meatus urinarius* accompanies the occlusion of the vulva, the child does not pass urine, is restless, cries, and in a little time a tumour, formed by the distended bladder, is observed at the hypogastrium. The orifice of the urethra is closed by a complete or incomplete membrane which becomes stretched at the time the child makes efforts. An incision and the use of a catheter for some days are sufficient to cure this deformity.

Sometimes, instead of a simple membrane, there is a narrowing or a complete obliteration of the urethra, which renders the case much more serious. Sometimes in this case, as Littre and Cabrol have observed, the urine ascends by the urachus and escapes by the umbilicus through a small, soft, red, and spongy excrescence. This state of things may last for ten or twelve years, and even throughout life. Usually the child dies from retention of the urine, urinary infection, peritonitis, or rupture of the bladder.

In this case the attempt should be made to form an artificial passage for the urine by creating a canal at the situation, and in place of that which should exist. In a similar case of occlusion I should not hesitate to make it by practising puncture of the bladder in the direction of the urethra, and by means of the continued introduction of the catheter to preserve the formation of the artificial canal.

7. On Vulvar Hæmorrhage.

The womb is of small size in infants, its fibrous tissue is pale and indurated, its cavity filled with mucus. The vagina, of tolerable size, is filled with thick and compact mucosities. These organs appear but slightly vascular; they are, however, sometimes the seat of hæmorrhage which has been incorrectly regarded as a very precocious menstruation.

Billard has twice observed effusion of blood in the form of clots into the cavity of the uterus in little girls who have died after birth. M. Mallat has remarked a child who had, some days after birth, vulvar hæmorrhage, followed by the formation of a vaginal clot, which was drawn out by the mother at the end of two weeks. At the same time, swelling of both mammary glands was observed. All soon disappeared; the flow of blood lasted about ten days. Dr. Camerer has observed a similar case, four days after the birth of a little girl born at the full term. Some drops of blood escaped by the vulva, and the flow did not reappear; five days afterwards the breast become momentarily swollen, and the child remained in good health. Barrier cites a precisely similar case. Lastly, Ollivier of Angers, who appears to have observed this hæmorrhage rather often, has affirmed that it is not very uncommon in children at the

breast. According to him, the blood, which is red and liquid, flows for a week, fifteen days, or more, without the child being apparently in any way affected. The flow stopped of itself, and only required attention to cleanliness: and it appeared to him that this was a sort of prelude to the function which should become established at puberty.

With due deference to M. Ollivier, this is a great mistake. The vulvar hæmorrhage, which comes on after birth, is only observed once, and cannot be likened to the hæmorrhage of menstruation. In order to establish this fact, something more than supposition is necessary, and the anatomical examination of the ovaries or the periodical reproduction of the flow can alone support the hypothesis.

If the form of hæmorrhage above described is not comparable to menstrual hæmorrhage, the same is not the case with that of which Bourjot Sainte-Hilaire has given us the history.

Mathilda H——, of poor family, was born at Lousiana, 31st of December, 1827, with the breasts well formed, and the pubes furnished with hair like that of a child from thirteen to fourteen years old. At the age of three years, the catamenia appeared and continued to appear regularly every month up to the time when M. Lebeau, physician at New Orleans, transmitted this fact to M. Geoffroy Sainte-Hilaire. The catamenia were each time as abundant as in a woman at puberty; the duration of each menstruation was four days.

Other similar cases to this are recorded in medical science; and these may be reasonably considered as examples of premature menstruation, the periodicity of the hæmorrhage, its nature and duration furnishing the proof of this.

8. On Gangrene of the Vulva.

Gangrene of the vulva has never been observed in the newly-born child; it is very rare in the infant at the breast, and only becomes rather common at a more advanced period of childhood.

Gangrene of the vulva is the result of a general disposition under which children are placed, and it is brought on by an occasional irritant cause; masturbation, or the leucorrhœa, so frequent in the course of acute diseases, and especially of eruptive fevers. Erosions and ulcerations form on the internal surface of the greater and smaller labia; being incessantly bathed by a very acrid white discharge, they become more irritated, extend and coalesce; they become covered with a fœtid purulent sanies, and cause the formation of a subjacent inflammatory nucleus, which forms the starting point of the sphacelus. If this inflammatory plastic nucleus is not destroyed, sphacelus is inevitable. It rapidly extends, and invades the skin, an eschar, first greyish black, then black, forms, destroys the great and small labia, the clitoris, the perinæum as far as the anus, and the

contiguous parts of the thighs, and death follows after fearful disorganization.

The genital parts are the seat of a greyish, sanguinolent, fœtid discharge. The passage of the urine incessantly irritates the parts, and causes the most severe pain. The general state rapidly becomes more serious, the fever continues, the children do not eat, they become emaciated and very much prostrated, and eventually die from the marasmus consequent upon suppuration.

It is a very serious disease, which is allied to a state of general debility of the economy, and one which every one, in fact, knows is only observed at the end of acute or eruptive diseases. It often exists with gangrene of the mouth, of which it is the usual complication, as has been observed in describing that disease. It may be cured when it exists alone, isolated from every other disease; in the contrary case it most usually terminates in death.

When gangrene of the vulva is about to be cured the eschars become detached and fall; healthy granulations cover the subjacent wounds, suppuration of good quality is established, and cicatrization gradually takes place. We should be always on guard lest it should take place in an unfavourable manner, and lead to the occlusion of the vulva, of the urethra, &c.

Treatment.

As soon as the commencement of the gangrene is discovered, we must not hesitate at once to thoroughly cauterise the starting point of the disease. A piece of lint dipped in nitric or hydrochloric acid, or the actual cautery at white heat, should be applied on the gangrenous ulcer or on the spot situated beneath it. If the acids are made use of it is necessary to repeat the cauterization morning and evening until the wound has assumed a satisfactory appearance.

In addition, we should apply repeated lotions of wine of bark, aromatic wine, or a disinfecting solution of chloride of soda, sprinkle the wound with bark or charcoal, keeping the great labia separate by means of a pad moistened with styrax ointment, and administer baths daily.

If there is no absolute contra-indication the children should be supported by a good regimen, by generous food, analeptic pastes, chocolate, a little Bordeaux wine mixed with wine of bark, &c. This is the best way to sustain the strength and to keep the children alive during the period that the local affection occupies in healing.

9. On Pruritus of the Vulva.

Pruritus of the vulva is rather common in little girls from one to three years old. It is especially observed in feeble or lymphatic

children, or in those born of parents themselves of feeble constitution. Pruritus of the vulva is sometimes accompanied by leucorrhœa, and appears to be occasioned by an alteration and a vitiated secretion of the mucous membrane of the vulva. The children incessantly scratch themselves, and this may originate the habit of onanism.

The children should be bathed every day in infusions of bran, or of the leaves of the walnut tree. They should be washed several times a day, either with aromatic wine or aromatic vinegar diluted with water, or with a solution of eight grains of corrosive sublimate in one pint of water, or a solution of sixty to one hundred and twenty grains of borate of soda in one pint of liquid.

10. On Congestion of the Breasts.

There is sometimes observed in the newly-born, whether boys or girls, a painful swelling of the breasts, which lasts from four to five days, and which, on pressure of the breast, allows the escape of a drop of colourless and viscid liquid. This swelling disappears naturally, and the small gland appears to be entirely atrophied. It becomes manifested in a very evident manner in cases of hæmorrhage from the vulva. It is a true congestion of the breast. Dr. Camerer, Ollivier of Angers, and Barrier have described this phenomenon in a very precise manner; one of these cases has been related when treating of vulvar hæmorrhage.

Malformations and Imperfections of the Bladder.

[Malformations and imperfections of the bladder may be included under the following heads—I, absence of the bladder; II, bilobation or multiplication of the organ; III, congenital extroversion. Complete absence of the bladder is very rare; that there is no foundation for the statement that such a condition must be accompanied with imperfect development of the kidneys, absence of the urethra, and defective development of other organs, is proved by the examination of the body of Abraham Clef, the account of which is quoted by Gross (*A Practical Treatise on Diseases and Injuries of the Bladder, &c.* Philadelphia; 1851) from Benninger. In that instance the bladder was totally wanting, the urine flowing from the kidneys directly through the ureters into the urethra; and although it is not stated whether the urine was discharged involuntarily and constantly, it is evident that the inconvenience was not extreme, as the patient had managed to conceal the infirmity both from his physician and his friends.

Congenital subdivision of the bladder into two or three compartments are on record. Gross cites a case in which a child, who died when eight weeks old, was found to have a sort of supernumerary bladder, in the form of a pouch, filled with urine, arising from the lower and back part of the bladder, at the place usually occupied by the right seminal vesicle, and attached by a narrow pedicle.

Occasionally the bladder is very small, whilst the other portions of the urinary apparatus are of normal size; its parietes are then imperfect; it is in fact represented by a delicate mucous bag, a mere dilatation of the ureters.

The various fissures of the bladder which have been observed are other forms of arrest of development. The cases of fissure or division of the bladder by

means of a perfect or an imperfect partition in the median line, the so-called double bladder, is very rare.

Extroversion of the bladder is the most interesting in a practical point of view, and at the same time the most frequent of the malformations of this viscus—it forms a disgusting deformity, and various operative procedures have been devised for its alleviation. In a case at St. Bartholomew's, an attempt was made to divert the flow of urine into the rectum—the patient died of peritonitis; and more lately, at St. Thomas's, Mr. Simon very ingeniously endeavoured to make the ureters permanently open into the rectum—the operation partly succeeded; but after a time the openings of the ureters became contracted, and the patient died.—P.H.B.]

BOOK XV.

ON THE ERUPTIVE FEVERS.

The eruptive fevers are less often observed amongst the newly-born and children at the breast than in the second stage of childhood; on the other hand, they are usually more severe at this first period of existence, for in their invasion and progress they then present numerous irregularities which are not observed at a more advanced age.

These constitute specific diseases, which have for their necessary and absolute cause a specific, fixed, or volatile agent, termed the *virus*. They all result from the impression exercised in the organism by this agent, which runs with the blood, and escapes on the surface of the skin in the liquids which emanate from the blood.

The eruptive fevers of the first period of childhood are small pox, and the eruptions of modified small pox, varioloid, chicken pox, measles, and scarlatina. Their three generating causes are the variolic, morbillous, and scarlatinous virus.

Variola and scarlatina are very rare in the first years of existence, and if their anatomical characters are the same as in the adult, their symptoms, although very nearly similar, present some differences with which it is well to be acquainted. They will now be described; we shall then treat of the eruptions of modified small pox, also known under the name of trivial small pox, and which often occasions mistakes amongst children which we should know how to avoid. Measles will then be described, the most important of the eruptive fevers amongst children, as much on account of the symptoms which accompany it as of those which follow it.

However, before commencing the description of these, we should bestow a short time on the subject of vaccination, an operation which all practitioners should well understand—firstly, in order to practise it at the proper opportunity; and secondly, in order to be acquainted with the symptoms which it may originate.

CHAPTER I.

ON VACCINATION.

The term *vaccination* is applied to the inoculation in man of the matter contained in the pustules developed on the udder of cows, and described under the name of *cow pox*. This inoculation produces an eruption of similar pustules, the development of which almost constantly resembles those of small pox, and always diminishes the action of its contagion when it does not completely screen the individual.

We will now describe, 1st, the method of practising the operation of vaccination; 2nd, the results of this operation; and 3rd and lastly, the symptoms which it may originate, and to which the name of secondary vaccinal eruptions has been applied.

1st. The inoculation of cow pox or of vaccine matter, that is to say, the operation of vaccination, is practised by means of blisters, incisions, or punctures.

The proceeding by puncture is that usually aodpted; it is quite as efficacious in its results and less painful in its application.

A lancet specially devoted to this use is taken, the point being charged with a drop of vaccine matter, and after having with one hand made tense the skin of the arm over the situation of the insertion of the deltoid muscle, with the other three or four inoculations are made. The lancet should be introduced horizontally and gently so as only to wound the superficial layers of the skin, and it is to be pushed forwards until a drop of blood exudes. The operator then applies the thumb of the hand which fixes the arm on the puncture so as to retain the instrument in its interior.

The operation should be practised on both arms, and the punctures should be about one-third of an inch apart. Care should be taken not to vaccinate on the shoulder in girls, so as not to leave disagreeable scars on a spot which the fashion of dress allows women to leave uncovered on evening visits.

Vaccination should be practised as much as possible from arm to arm, that is to say, by taking the vaccine matter from another healthy child, of good constitution, which presents well developed vaccinal

pustules at the fifth or seventh day of the inoculation. However, this proceeding is not absolutely necessary. We may make use of vaccine matter preserved from air and light between two plates of glass or in cylindrical capillary tubes of glass, about one inch in length, invented by M. Bretonneau.

When the vaccine matter is collected, it should be taken from the pustules on the fifth or seventh day. It is placed between the applied surfaces of two plates of glass, which should be covered with lead paper. It becomes dry and keeps good for several months. When about to be used it should be moistened with a very small drop of cold water until it has acquired an oleaginous consistence, and the above described operation practised.

If the glass tubes are made use of to collect the matter, it is done in the following manner: the capillary tube should be open at its two extremities. It is applied on the pustule, superficially lacerated by the lancet and surmounted by a drop of vaccine matter. This fluid naturally rises in the tube by capillary attraction; the tube is then closed when it is full. It is then preserved from the action of heat, so that the vaccine matter can undergo no alteration. When required for use, the two extremities of the tube are broken off, and by blowing at one end the fluid contained in its interior is received on a spoon or on a plane and polished surface. It is then made use of for the operation required.

It is no inconvenience to the children to collect their vaccine matter; it may be taken with impunity, without fear of detriment to the preservative qualities of the vaccination. The opening of vaccinal pustules is not at all dangerous, and in no way increases the inflammation of the arm which follows vaccination.

This fluid should be taken from children in good health, and in whom the pustules have arrived at the fifth or seventh day of their development.

It has been thought that it was necessary to submit those about to be vaccinated to a preparatory treatment; this is not indispensable, and if it may be done in the cases of adults, it is useless in young children. This treatment consists in diet, and in the use of slight purgatives repeated for several days consecutively.

2nd. *Development of the vaccination.* Three or four days after the inoculation of the vaccine matter, little red projections of the skin appear at the situation of the punctures, and which increase rather rapidly. On the fifth day each of these elevations becomes circular with a depression in the centre; on the sixth day it is more flattened and whitish, it has the form of a small disc about a quarter of an inch across, depressed in the centre, and surrounded by a small red areola. At the seventh day, the pustules increase in size, become flattened, and

assume a silvery aspect; a small areola surrounds them. On the eighth day, the colour changes a little; the pustules, always flattened, are a little more swollen and assume a deeper colour; they are surrounded by an inflammatory areola of some extent, which still further increases during the three following days. On the tenth day, the pustules are very large, being about half an inch across; they are very much swollen, depressed in the centre, and contrast by their pale colour with the inflammatory redness of the integuments; their surface appears granulated and slightly roughened, and by means of a lens a large quantity of small vesicles filled with a transparent liquid may be observed. The vaccine matter is enclosed in the pustule in a cellular pseudo-membrane, nearly in the same manner that the vitreous humour of the globe of the eye is enclosed in the cellular membrane which supports it.

At the twelfth day the period of dessiccation commences; the central depression assumes the appearance of a crust; the matter contained in the disc above alluded to becomes thick and opaline; the inflammatory areola becomes pale and the vaccinal pustule begins to collapse. This process is continued on the following days.

The pustule up to this period is cellular, and forms but a single cavity;* it then becomes dry, forms a hard crust, of a yellowish black colour, which remains until the fifteenth or twentieth day. During this time the inflammatory redness of the skin diminishes and disappears, and when the crust is detached, a deep, puckered, ineffaceable cicatrix remains.

When the vaccinal pustules are in full vigour, and when the inflammation which surrounds them is rather considerable, the children are observed to be uneasy, restless, and to be more or less feverish, which is nothing to be alarmed at. The arm is the seat of an acute pain; the glands in the axilla becomes enlarged; but these symptoms soon disappear with the cause which produced them.

The progress of the vaccination is not always such as has been just described. There are children in whom the pustules shrivel almost immediately after their appearance without their becoming completely developed. There are others in whom the inoculation does not occasion any pustule, and appears to have been unsuccessful; in this case we must revaccinate until pustules of a satisfactory nature are obtained. However, children are met with who are refractory to this inoculation, and there are others who, having been vaccinated, are, at the end of some days, seized with a slight fever of short duration, without the development of the vaccination; this has been termed *vaccina sine vaccinis*. Examples of it are very rare.

Vaccination is not a disease, it does not in general cause other symp-

* Rayer, *Traite des maladies de la peau*. Paris, 1835: t. i, p. 607.

toms than those we have enumerated, that is to say, slight inflammation of the arm, swelling of the axillary glands and fever. These symptoms require no treatment; the children should be kept cool, the quantity of their food moderated, and some baths made use of. If the inflammation of the arm is very intense, emollient lotions or poultices should be prescribed, which will suffice to diminish the pain and the inflammatory swelling of the skin.

The protecting power of vaccination against small pox is indubitable. It was much more manifest formerly than in our times, when it appears that the vaccine virus is weakened and sometimes powerless as a preservative against this disease. In fact, we observe, in very rare cases, in proportion to the number vaccinated, small pox become developed in subjects who have been submitted to vaccination.

However, whatever may be the value of vaccination, it cannot be denied that it has nevertheless rendered immense service to humanity. it must however be admitted that it is less efficacious than it was at the first period of its discovery; and this will readily be admitted, for it is known that all kinds of *virus* become weakened in proportion as they are inoculated and as new generations are made virulent; but such as it is, this means is still excellent.

We may, by renewing the vaccine virus, give it all the desirable properties; thus practitioners have several times made use of new cow pox in order to regenerate the vaccine matter. Consequently, this preservative means resumes all its importance.

For those who cannot procure this new vaccine matter it may be very advantageously replaced by revaccination at the end of fifteen to twenty years with the old vaccine matter. If the vaccination succeeds, then was the patient liable to contract small pox; if on the other hand it does not succeed, then the previous vaccination has lost nothing of its properties.

Besides, the new vaccine matter will be rapidly disseminated in France, thanks to the zeal of the vaccination board of Paris, which responds to all the demands of the most distant practitioner, and which sends, on application, vaccine matter which possesses all the desirable preservative qualities.

3rd. *On secondary vaccinal eruptions.* Vaccinal pustules have been sometimes observed to become developed on parts of the body where the vaccination has not been at all practised. It is always, as M. Rayer remarks, on surfaces inflamed or deprived of the epidermis, on chronic eczemas, on excoriated lichens, &c., that these secondary pustules become developed. They are sometines produced by an accidental and posterior inoculation which the vaccinated person has performed with his fingers, after having scratched the pustules when the constitution has only been incompletely modified by the

first eruption. More often the supernumerary pustules are the result of a secondary eruption, analogous to that which is so often observed in inoculated small pox.

The secondary vaccinal eruptions are in general of an erythematous nature. Thus the vaccinated arm becomes the starting point of an erysipelas, sometimes serious, which extends over the whole body and causes the death of the children if they are very young. Roseola very frequently covers the body at the period when the inflammatory areola of vaccination is at its highest degree. This eruption is not serious, it may momentarily slightly disturb the health of the children by giving them an intense fever; but it only lasts a short time and becomes dissipated without leaving any traces.

The treatment of these secondary eruptions is very simple. When erysipelas is present, the means recommended in the chapter devoted to this disease must be made use of. As to roseola, it may be allowed to progress, administering emollient or diaphoretic drinks to the patient, and placing him in a well-warmed apartment, protected from the influence of cold and damp.

[A paper has just been published by M. Bossu (*Journal Hebdom.;* March 17th, 1854) upon inoculation, with a mixture of milk and variolous pus to supersede vaccination. M. Thield (of Kassan), and M. Robert (of Marseilles), have proposed to blend variolous matter with milk, for the purpose of weaking the poison attenuating it, and localising its effects upon the economy. This proceeding, justified by some success, has attracted considerable attention, because it furnishes the means, in the event of small pox invading any locality, of replacing the vaccine matter, which may be defective in quality, or deficient in quality, with a prophylactic furnished by the epidemic itself. In 1832, M. Brachet (of Lyons), starting with the idea that the vaccine eruption probably owed its properties to the milk contained in the breast where it was developed, inoculated three young children with a mixture, in equal parts of milk and variolous pus. These three patients were put in a ward where a girl infected with confluent small pox had just been admitted. The infants escaped; but each became affected round the punctures with an eruption precisely similar to that produced by the vaccine virus, and which remained local.

New experiments have been recently tried at La Charité, at Lyons, by M. Bouchacourt, surgeon in chief, and to these we shall direct attention.

Equal parts of cold milk and variolous pus taken from the pustules in the vesicular stage of naturally-developed small pox, were mixed upon a piece of glass. Punctures were made in each arm with a clean lancet charged with this liquid. Five infants were directly inoculated. Three were inoculated successively from arm to arm with the liquid contained in the pustules resulting from the first inoculation: primary transmission. Three were inoculated from arm to arm with the liquid obtained from these new essays: secondary transmission. Four were inoculated from arm to arm with the liquid coming from this second indirect inoculation: tertiary transmission; success, as with the preceding. Three were inoculated with the liquid collected from the pustules produced by the first transmission, and preserved eight days; two with the liquid preserved eleven days, and finally, one infant was inoculated with the liquid coming from the pustules produced by this last experiment.

Of these twenty-one children, of ages varying from eight days, five months, and

eleven years, eighteen presented pustules precisely similar in character and duration to those of cow pox, limited to the seat of puncture.

In two newly-born infants the circumference of each pustule offered, about the sixth day, one or two smaller pustules, but these disappeared as the mark of inoculation faded.

In another child, aged five months, there followed four pustules scattered over the neck and shoulders. They were small, vesicular, and not depressed, and disappeared with the pustules produced by inoculation. This infant was very susceptible, and the poison had been taken from a case of confluent small pox; thus the phenomena were not more serious than those resulting from ordinary vaccination.

It then became necessary to test its power as a prophylactic.

Three of the children above mentioned were vaccinated in the usual way eight or ten days after the disappearance of the phenomena, resulting from the lacto-variolic inoculation; and at the same time two other children about the same age, but who had neither had small pox or cow pox, were vaccinated with matter coming from the same pustule. Vaccination developed itself in the last in its common form. In the first no effect ensued. A child previously vaccinated was inoculated with the lacto-variolous pus. The result was negative.

Commencing with this equivalence between vaccine virus and the lacto-variolous fluid M. Bossu proposed a series of inquiries to determine — 1st. From what form of small pox should the virus for inoculation be taken. 2nd. At what phasis of pustulation should it be collected? 3rd. At what age the operation is most fitted. 4th. What conditions ensure success? 5th. Does the fluid coming from the lacto-variolous pustule admit of being preserved in an efficient state?

The interest attached to this subject, and the able manner in which it has been treated by M. Bossu are acknowledged; but further investigations are required before the practice can be sanctioned by the profession.—P.H.B.]

[On the influence exerted on small pox by vaccination during the incubative period. After a brief recapitulation of opinions, M. Barthez relates two observations bearing on the effect of vaccination at the commencement of small pox, and thus concludes—1st. That if vaccination be practised during the incubation of variola, so that the vaccine eruption precedes the variolic, this latter will be almost always modified. 2nd. That in the great majority of cases, this modification will be favourable. 3rd. That if the variolic fever does become severe, this is to be attributed to the previous impaired state of health, and to the youth of the patient. 4th. That in this last case, the vaccinea, the third malady, added to the two former, does not exert a favourable influence on small pox.—(*British and Foreign Med. Chir. Rev.;* January, 1854.)—P.H.B.]

CHAPTER II.

ON SMALL POX.

Small pox is a contagious, eruptive fever, characterized by the appearance of centrally depressed pustules on the surface of the skin.

It is the result of the infection of the body by a fixed or volatile

inappreciable virus, which propagates itself directly from one individual to another, or indirectly by the medium of the air and of certain foreign bodies as the crust of pus, linen, clothing, &c. This is what is termed the *variolic virus*. It does not act with equal force on all subjects; some resist its action, others are liable beyond all that we could foresee. There is here, as in all diseases, a kind of very evident aptitude to contract this disease, an aptitude which depends on individual idiosyncracy and which may be neutralized or destroyed by means of *vaccination*. The aptitude to contract small pox is greater in the fœtus in the womb of the mother, than in the newly-born. It diminishes after birth, and returns in a very evident manner towards the age of five or six years. It again disappears in the aged, who are very seldom attacked by small pox. Lastly, it is the same in the two sexes and in all the human races.

Small pox is *contagious*, *epidemic*, and often *congenital*.

Small pox is *regular* or *irregular*, *discrete* or *confluent*, *benign* or *malignant*.

[The infection of the fœtus in utero does sometimes unquestionably happen; in one instance, related by Mr. Flinders, the disorder was eight or ten days later in the fœtus than in the mother. A woman, near her full time, took small pox. The pustules were mature about the 10th or 11th of June. On the 18th she gave birth to a full-grown boy, upon whose face and body there were many pustules, discrete, and nearly ripe. The child died the same night. In the *American Journal of Medical Science* is mentioned the case of a fœtus which was born completely covered with discrete variola in the pustular stage, apparently about the eighth day of the disease. The mother had been vaccinated when a child; had never had small pox; but was very fearful of it, and had a very mild attack of the disease. But the fœtus may catch the disease through the medium of the mother, although she, having had it previously, may be unaffected by the contagion. Dr. Mead relates the case of a woman, near her reckoning, who attended her husband in this distemper. She was delivered, at the full time, of a dead child, which was covered all over with the pustules of small pox. Dr. Jenner gives an account of an infant who, upon the fifth day of its age, became indisposed, and on the seventh exhibited the eruption of small pox, so that the contagion must have been communicated to it while yet in the womb. A few days before her confinement, the mother of this child had seen, in the street, a person covered with small pox pustules, the smell and sight of whose body had sensiby affected her. Sir William Watson describes an instance in which the scars left by the pustules were visible upon an infant at its birth. This child was afterwards inoculated without taking the disease. Its mother, who had formerly had it, nursed, when far advanced in pregnancy, a servant ill of small pox. Dr. Pearson met with a similar example: Mary Spooner was inoculated by him in her sixth month of utero-gestation, and had the disease severely. Her child was twice inoculated with small pox matter, but without effect.— *Watson's Lectures.*— P.H.B.]

Anatomical Alterations.

When the specific cause of small pox has determined the organic

reaction which favours the development of this eruptive fever, red, slightly projecting *papulæ*, more or less numerous, appear on the surface of the skin; their redness disappears under the pressure of the finger and assumes its colour as soon as the pressure has ceased; the epidermis becomes softened at this spot in its deep layer, and thus permits the effusion of a very small quantity of transparent serosity, which is alkaline according to M. Petzholt of Leipsic, and thence small *whitish vesicles* result. The vesicle quickly increases and becomes depressed at the centre so as to form a kind of disc. According to M. Rayer, this central depression depends on the formation of a small deposit of fibrine perforated at the centre, and according to M. Petzholt, on the presence of a glandular conduit, which, under the form of an epidermic filament, is attached at one end to the epidermis, and at the other to the surface of the skin.

At the fourth or fifth day, the vesicle becomes increased and changed into a centrally depressed projecting pustule, white towards the centre, red at the circumference; the fibrine, under the form of a perforated pseudo-membranous disc, is observed in the interior, the papillary body becomes the seat of a more or less decided erosion.

The pustule is at first filled with an opaque serosity which augments and soon becomes converted into pus; this becomes fused around the pseudo-membranous disc, detaches the epidermis, which it raises, causing the central depression to disappear. The pustule then is observed under the form of a large whitish vesicle, red at the circumference. It soon becomes lacerated, causing the escape of the pus which it encloses; at first it is covered with yellowish, soft, and transparent crusts, which are termed melicerous, then with dense, blackish crusts, which become detached at the end of twenty-five or thirty days, leaving behind them, for two months, red stains upon the body, and reddish excavations on the face.

Similar pustules are observed on the roof of the palate and on the surface of the tongue, but they never acquire much volume and never become covered with crusts.

The same is the case with the cutaneous pustules which become developed on the child in the womb of the mother, that is to say, on the fœtus bathed in the liquor amnii. Here the pustules are always in small number, whitish, flattened, and become cured without the formation of crusts, in consequence of the lubrication of the diseased parts.

The mucous membrane of the nasal fossæ is usually inflamed, red, softened, and sometimes ulcerated.

The intestinal mucous membrane presents some traces of inflammation, judging from the hyperæmia of which it is the seat in several parts, and sometimes from the apparent development of several of the glands of Peyer.

SYMPTOMS.

The small pox of young children should be studied in the fœtus as *congenital small pox*, and in children at the breast, in the *regular* or *irregular*, *discrete* or *confluent forms*.

Congenital small pox, of which I have observed eight examples, appears at different periods of pregnancy. I have never met with it before the third month. It is always discrete. It is developed in fœtuses the mother of which has, or has not, the small pox; in the first case, nothing is more natural, the mother has transmitted the disease with which she is attacked. But, however, it must not be believed that every pregnant woman, attacked with small pox, necessarily gives small pox to her infant; for M. Serres has observed twenty-two non-variolous children born of women who were attacked, or had been attacked, by small pox. In the second case, the fact is more extraordinary, and if M. Rayer, M. Chaigneau, and myself, had not seen children born with small pox, the mothers of which were free from this disease, it would indeed be difficult to give credence to it. In this case the vaccinated mother is not liable to the action of the variolic virus; she resists its influence, and only serves as the means of communication between the virus and the infant. M. Deveux has cited a case of this which I have elsewhere reported.*

When small pox is developed at the same time in the mother and fœtus, the appearance of the pustules sometimes takes place at the same instant, otherwise, on the contrary, according to the observations of M. Chaigneau, the eruption is more tardy, and does not show itself until a long time after the termination of the eruption in the mother.

It is not known what are the phenomena of the invasion of congenital small pox. It is only known that the pustules, always in small number, flattened, whitish, suppurate slightly, and heal without forming crusts, bathed as they are in the liquor amnii. They resemble the variolic pustules of the buccal mucous membrane in the adult, with this difference, that they are nearly always of larger size.

It is said that in cases of twin pregnancy, one fœtus has alone been observed to have taken the small pox, the other one not having had the disease. The case is possible, but I am ignorant of the author of it, and it is as well only to accept it with considerable reserve.

After birth, small pox is seldom observed in the course of the first year; I have, however, seen several cases of it in children of one, two, and eight months old; the liability to it appears especially to commence at the thirteenth month, principally in the case of an epidemic.

The period of incubation of the disease is variable, and I have not been enabled to determine it. In the second stage of childhood it is from six to fourteen days. Small pox commences by fever, uneasiness, nocturnal

* *Mémoire sur les maladies contagieuses.*

agitation, sometimes by vomitings and convulsions, a fact denied by MM. Rilliet and Barthez. At the end of twenty-four or forty-eight hours or even more, reddish pimples appear on the surface of the body; they soon become transformed into whitish vesicles, and the fever becomes much diminished without disappearing; this is the *primary fever;* then the vesicles become changed into opaque, centrally depressed pustules, and suppuration then distends them and fills them towards the sixth or seventh day. There is then great increase of fever constituting the *secondary fever*, caused by the suppuration. The children are thirsty and have some difficulty in drinking; they cough, and their respiration appears obstructed; dry and humid râles obscure the respiratory sound; the face is sometimes swollen; the conjunctivæ injected; the edges of the lids, often the seat of variolic pustules, are covered with pus, and the cornea itself becomes ulcerated in some children. Then, if the symptoms are not too severe, the pustules become dry, crusts form on their surface; they become detached at the end of a variable time, and the child is cured.

If the small pox is discrete, that is to say if the pustules are not too numerous, the symptoms such as I have above described may succeed each other very regularly. But even in this case, I have seen a child die at the commencement of the period of eruption, and others in consequence of intercurrent diseases, and especially broncho-pneumonia.

I have never observed confluent small pox in young children, and I know not if practitioners have observed cases of it in their practice or in the hospitals. It is a question which the future should decide.

Small pox sometimes appears amongst children in a primary manner, and it is the principal pathological fact, which commences the progress of the morbid phenomena. In other cases, principally in our hospitals, small pox is consecutive and appears in the convalescence of acute diseases. It then presents irregularities in its evolution; it is much more serious, and seldom fails to carry off those it attacks.

Do cases of complicated small pox, and cases of malignant and ataxic small pox, similar to those in the adult, exist in the young child? It is possible; but medical science is not yet sufficiently advanced to settle this point in a decided manner. Analogy may readily permit us to foresee that such is the case, but observation has not yet demonstrated yet. We must then wait before a decided opinion can be given on this subject.

Diagnosis.

An unvaccinated child who presents febrile phenomena, restlessness, vomiting, and an eruption of centrally depressed pustules with free suppuration, is attacked with small pox. There is only the varioloid

disease, so frequent in infancy, which can be confounded with this disease. But in the varioloid disease, the children have been vaccinated, which is a probability against small pox; the pustules are small, with the central depression ill-defined, they do not suppurate completely, immediately become dry, and very soon detach the crusts.

Prognosis.

The prognosis of small pox is very unfavourable in young children. With regard to the fœtus, it is often the cause of its death and of its premature expulsion. However, there are some which may recover, Mauriceau for instance, who it is said was born with traces of small pox.

In children at the breast, small pox is much more serious than in the adult, by reason of the complications to which it gives rise. In this respect there is but slight choice between primary small pox and consecutive small pox. However, I consider the latter to be still more fatal than the former. It is a disease which causes the death of the greater number of the subjects attacked by it. In the tender age there is scarcely any other variety but the discrete and regular small pox which can be cured. From the period when the disease becomes irregular, death is almost invariably the consequence.

[The following abstract from the Report of the Registrar General, shows the total number of deaths in London from small pox, during 1845-49, and the number of deaths in each quarter:

	1845.	1845.	1846.	1848.	1849.	Total of the quarters.
Quarter ending March . . .	481	77	82	388	228	1256
,, June . . .	246	87	131	381	113	1008
,, September . .	76	51	320	435	78	960
,, December .	106	42	372	413	99	1032
Total of the different years .	909	257	955	1617	518	

P.H.B.]

Treatment.

The treatment of small pox is preventive and curative.

At present there is no other preventive treatment of small pox to be made use of but vaccination, the practice of which has been previously described. The inoculation of small pox which was formerly practised has been abandoned for vaccination, and it is now endeavoured to practise it again in some localities, under the pretext of the insufficiency and of the danger of vaccination, it should not, as it appears to me, be resumed in honour. The vaccine matter should be renewed if it has lost its power, and should be chosen from healthy subjects, and revaccination should be practised every fifteen or twenty years; but we should not again return to a means the dangers of which are very much more serious than the imaginary dangers of

vaccination. If it was a matter of fact, however, as M. Carnot has recently pretended it to be, that vaccination only preserves us from one disease of childhood, in order to favour a disease in the adult, typhoid fever, and that the mortality diminished in the first period of existence is compensated for by the mortality of the adult age, so as simply to displace the date of the contingent, which must be furnished to death, vaccination would be nothing more than a melancholy and deceptive conception destined to abandonment and oblivion. That it would, in fact, be better for the prosperity of a state that the necessary mortality of a population took place at the first period of existence than that it should seize upon the adult age. The feeble alone succumb before the epoch at which they may procreate new beings as feeble as themselves, the consumption which they occasion would take another course in the country, and, by this means, the improved race would enjoy a greater material prosperity. But all these ideas are based upon the statistics of M. Carnot, which are anything but exact. This author has collected his documents from the registeries furnished by the hospitals of the central administration, and by the mayoralties of the city of Paris. He is not aware that all these registeries are radically false, and that, nearly universally, the reduction of the verifications of death being left to medical men, who are often ignorant of the causes of death, or in the hospitals to negligent or inexperienced pupils, the most incorrect denominations are often put on the returns of deaths, and to rely on this source for the proofs of the existence of typhoid fever, is to rely as much on error as on true information. Besides the synonymes employed by practitioners, there are errors of ignorance, of bad faith, of inadvertence, and lastly, the irregularities of the returns of death at the commencement of this century. We cannot, then, compare the actual mortality with the mortality anterior to vaccination, in order to refer to typhoid fever what was formerly referred to small pox. This statistic, founded on incomplete administration tables, and replete with errors, falls to the ground then as soon as its erroneous elements are assailed; and to found upon it conclusions unfavourable to vaccination is, at least at present, to prejudicate a question which entirely remains to be decided.

When the eruption appears, the subjects should be moderately covered, so as not to place them in too warm a temperature. Excess of heat is very prejudicial to children, increases the fever, and probably also the number of the cutaneous pustules. We should strongly resist the insinuations of individuals who would always burthen the children with coverings under the pretext of facilitating the egress of the eruption. It is only a hurtful practice, henceforth discarded by experience.

When the eruption is out, it is right to destroy the pustules of the face which are developed on the edges of the lids, and on the conjunctiva or cornea. This may be accomplished by opening them with a needle, washing them, and then cauterising them with the nitrate of silver. The face should also be rubbed three times a day with a small quantity of mercurial ointment, so as to extinguish the pustules and to prevent the formation of frightful cicatrices. This means is not so efficacious as an abortive method as the employment of the plaster of Vigo, but it is a more easy method in young children. The following is a case in which it succeeded admirably.

Case. Small pox; mercurial unctions; recovery. A boy, two years and a half old, unvaccinated, of good health; has never had convulsions nor eruptive disease; suckled up to the present time; sixteen teeth.

This child has not been exposed to contagious influence.

November 19th, 1842. He is dull, without fever, without appreciable suffering.

20th. Depression, fever; slight constipation; in the evening convulsions, which were several times repeated in the course of the night.

21st. In the day, three very strong convulsions; in the night they were much less strong.

22nd. No convulsions, no vomiting; constipation. From the commencement of the disease the child has not ceased to shed tears. In the evening, the commencement of the eruption of the pustules.

23rd. Their number increases.

24th. No fever. The eruption covers the face; it is on the limits of a discrete small pox and a confluent small pox. The pustules are already well formed; three of them are depressed in the centre and full of milky serosity. The back, the arms, and the thighs, present a great quantity of pustules of the same degree of development and of the same irregularity. Some of them contain serum, and are depressed in the centre; others are in the state of pimples. Lastly, there are some others in the thickness of the dermis in the state of redness.

No fever, unctions with mercurial ointment; six drachms of manna.

25th. The pustules on the body are well developed. Some of them are nearly half an inch across, whitish, and commence to be centrally depressed; there are yet some which are beginning to come out; those of the face are slightly more advanced than those of the body; no fever; very frequent sneezings for the last two days.

Purgative enema; mercurial unctions.

26th. The pustules of the body and of the face are, with very few exceptions, filled with milky serosity, some are larger than others; the largest are centrally depressed and begin to be surrounded with an areola of inflammation; the inflammatory areola is more red at the face than elsewhere; the face begins to be slightly swollen; slight swelling of the glands of the neck; the sneezings diminish; no vomitings; bowels open; no febrile heat; pulse 124, but the child is agitated. The mouth and tongue are covered with variolic pustules.

Emollients; mercurial unctions.

27th. The face is a little more swollen than yesterday; the eyelids are half closed; no swelling of the hands. The pustules of the face are of less extent than those of the body, less red, and are filled with serosity, which is becoming purulent. Those of the body possess an inflammatory areola already well defined; they are of larger size and have slightly lost their centrally depressed character.

28th. The swelling of the face has disappeared; the pustules on the face appear arrested; they have considerably diminished in size; they no longer enclose pus, and are nearly desiccated. Those of the body are large, projecting, without the central depression, and filled with pus; there is a slight redness surrounding them. The hands are not swollen.

29th. The pustules on the body enlarge; there has not yet been swelling of the hands and feet; the pustules on the face are abortive.

30th. The pustules on the face are completely dry; the swelling has completely disappeared from the face; the eyes are open. On the body the pustules have begun to break and to be covered with crusts; on the limbs all the pustules are full of pus, not one is dry.

December 3rd. The pustules are entirely dry.

January 13th. The child left the hospital after having experienced a slight attack of ophthalmia.

[Collodion would appear to possess an abortive power over the eruption of small pox. M. Aran, at the Bon Secours, refers to a case which occurred in the wards in which the good effect of collodion was as decisive in confluent small pox as it had been before in the more simple form; it occurred in the person of an unvaccinated young man, and the collodion was applied to all parts of the face but the lips and ears. Through this transparent covering the progress of the pustules was observed to become at once arrested, while those uncovered continued enlarging. Moreover, a part of the covering having been destroyed without being observed for some hours, the pustules thus exposed immediately began to develop themselves uutil again arrested by a reapplication. The ears too were now covered, and the progress of the pustules arrested there. In a few days the collodion peeled off, the skin looking as after erysipelas, but no cicatrices were to be observed, though in other parts of the body they existed in abundance, the eruption having been very confluent.—(*Bulletin de Therapeutique;* vol. xxxix, p. 369.)—P.H.B.]

The children may continue to suck, but the breast should be given them less frequently. If they are already weaned and well nourished, they should be restricted to diluted milk, which will serve them for a drink.

The cough should be treated by juleps of gum and emulsions, with the addition of from one to four drachms of the syrup of poppies, at most. If the breathing is much obstructed we must have recourse to an emetic composed of ℥ j of the syrup of ipecacuanha, and in case of bronchial and pulmonary inflammation, characterized by sibilant, sonorous, and subcrepitant râles, to one or two leeches at the pit of the stomach, and to a small flying blister at the sternum.

If convulsions or coma supervene, a leech should be applied behind each mastoid process.

After the detachment of the crusts, baths may be given without any inconvenience, and even, on the contrary, with every advantage. It is advantageous, also, to finish up by the employment of some mild laxative capable of relieving the bowels of the noxious matters accumulated during the course of the small pox.

APHORISMS.

292. Small pox attacks those liable to it, enters into the blood, and breaks out by the skin.

293. The liability to receive small pox varies with age; rather great in the fœtus living in the womb of its mother, rare in infants, very great in childhood, it becomes lessened in the adult, and disappears entirely in the aged.

294. Small pox is often congenital.

295. Intra-uterine small pox is an almost inevitably fatal disease.

296. Small pox is epidemic and contagious.

297. Small pox is regular or irregular, discrete or confluent, benign or malignant.

298. The small pox of young children is almost invariably discrete, but often irregular, which renders it very unfavourable.

299. A sudden convulsion, followed by fever and vomiting, in an unvaccinated child, would lead to the supposition of small pox.

300. The liability to receive small pox is neutralized by the inoculation of vaccine matter.

301. Decided small pox invariably follows the progress indicated by nature, and the eruption of the pustules on the skin can only be prevented to a very slight extent.

302. Broncho-pneumonia is a very frequent and a very fatal complication of the small pox of children.

303. The proper treatment of a simple, discrete, and regular small pox is to abstain from all energetic medication, and to content ourselves with prescribing rest and emollient drinks in the midst of a pure, mild, and temperate atmosphere.

304. The pustules of the face should be always made to become abortive by mercurial ointment or softened Vigo plaster.

305. The complications of small pox alone require the immediate and energetic interference of the practitioner.

CHAPTER III.

ON VARIOLOID.

The term *varioloid* is applied to a pustular and contagious cutaneous eruption, of the variolic nature, without secondary fever, originating from small pox, and able to produce it, and the duration of which is from one to two weeks.

Three sorts of varioloid must be admitted; pustular centrally depressed, globular, and conoid varioloid. All the three are developed

in vaccinated individuals at the time of epidemics of small pox, and sometimes, also, when these epidemics are not observed. The centrally depressed varioloid is the most important to recognize, for it presents great analogies with the eruption of small pox, and it is often difficult to distinguish the one from the other.

Varioloid does not appear until two or three days after the precursory symptoms, which are characterized in young children by fever, uneasiness, an unaccustomed restlessness, and sometimes by gastric disturbances, as vomitings, for example. Some children first present an eruption of roseola, and it is only at the end of twenty-four hours that the pustules peculiar to the disease we are now considering manifest themselves.

Red spots are at first perceived on the forehead, on the limbs, and lastly, on the body. They often make a considerable projection, and then put on the pustular character which is proper to them. Their number is never very considerable. In some patients they remain acuminated, or more or less rounded off; in others they present a central depression similar to that of the pustules of small pox.

These pustules enlarge and acquire the maximum of their development towards the fifth or seventh day. They are then surrounded by a small areola of inflammation, without swelling of the skin as in small pox. Suppuration is imperfectly established in their interior, or is not established at all, and desiccation commences towards the eighth day, at the same time that the inflammatory areola disappears. In some patients the desiccation is not effected until at a more advanced period of the disease. The crusts have nearly all fallen at the twenty-first day, that is to say, at the end of the third week.

The general symptoms of the eruptions of varioloid do not sensibly increase in children even by the fact of the eruption. The symptoms are very much the same in the course of the disease as at the period of its invasion. The fever persists at the same degree for some days, and diminishes at the time of the desiccation of the pustules. There is not, as in small pox, a primary fever, which momentarily ceases during the development of the pustules, and which reappears with such intensity at the period of their suppuration. In a word, there is no secondary fever. The state of uneasiness, wakefulness, and agitation of the children is the same. There is loss of appetite, and vomitings are sometimes observed. Convulsions are uncommon; however, they may be explained by the intensity of the fever in young children. It fact, it is known that in them it is by convulsions, and not by delirium, that the cerebral disturbance is betrayed. How can they have delirium, since their intelligence is not yet developed?

The pustules of the centrally depressed varioloid last a little longer than the pustules of globular and conoid varioloid. Their progress

is often similar to that of variolic pustules, and they sometimes completely suppurate before they become cicatrized. However, at the period of suppuration, there is no secondary fever as in small pox. The symptoms of this kind of varioloid are also more severe. It is in this variety that vomitings and convulsions are especially observed. The only case of convulsions which I have remarked in varioloid, occurred in a child who had been previously vaccinated, and in whom all the pustules were depressed in the centre.

Varioloid is not a serious disease; the children are readily cured; however, varioloid with the centrally depressed pustule is sometimes more serious than a discrete small pox. It is related than in an epidemic of small pox at Marseilles, twenty of the vaccinated died, and in them the disease presented all the characters of pustular varioloid.* This disease is never followed by the eruption of boils and by the hæmorrhages which are sometimes observed in small pox. From the period of the commencement of desiccation fresh symptoms hardly ever supervene, and unless complications which are quite special and unforeseen occur, the children may be regarded as cured.

The course to be followed in the treatment of varioloid is very evident. The eruption should be watched and allowed to accomplish its necessary phases. The children should be dieted and placed in a properly warmed apartment, sheltered from the action of cold and damp air. They should not be covered too much, so as not to increase the fever, or to bring on abundant perspirations and the erythema which accompanies the sudorific secretion. Lastly, emollient and warm drinks should be administered until they may be again suckled.

In the case of complications referable to the alimentary canal or to the head, the appropriate means should be employed to vanquish these symptoms. Ipecacuanha powder may then be useful to empty the stomach completely, and magnesia to neutralize the acids which it contains. As to convulsions, as they are not dependent upon a change in the brain, there is nothing to be done for them; they cease naturally, and antispasmodics can only be given, of which we have spoken in the chapter devoted to the history of these symptoms.

CHAPTER IV.

ON CHICKEN POX.

Chicken pox is an epidemic and contagious disease, characterized by the presence on the skin of vesicles, more or less numerous, filled with

* Rayer.

a colourless and limpid serosity. This disease must not be confounded with varioloid, the nature of which is very nearly identical, but the character of which is essentially different. In fact chicken pox is a vesicular affection, and the varioloid, on the contrary, a well characterized pustular disease.

Chicken pox is preceded by a slight fever which lasts from twelve to forty-eight hours at most. The febrile state is often scarcely to be appreciated, and as M. Rayer has pointed out, it does not prevent the children following their usual games. In some rare instances, the invasion of the chicken pox is preceded by abdominal pains, vomitings, &c.; but these instances must be very exceptional, for I have collected twenty-three cases of this disease, and in not one of them were any of these symptoms observed.

"Chicken pox is either discrete or confluent. It is characterized by small red slightly prominent spots, circular when they are isolated, irregular on the contrary when many are observed on the same spot. On the next day a prominent vesicle filled with a colourless or pale yellow perfectly limpid humour, which readily escapes when the vesicle is pricked, is formed in the centre of most of these elevations. On the second day this vesicle is about one line and a half in diameter; it either projects to a point or assumes a rounded form. On the third day the colour of the lymph is yellowish, but this is the only change which the vesicles have undergone. On the fourth day, those which have not been accidentally broken, diminish in size, and become shrivelled at the circumference. The fifth day, a small crust adherent to the skin is formed in their centre, and a small quantity of opaque lymph is enclosed in their circumference which sometimes gives them an appearance of central depression. On the sixth day, small yellowish or brown crusts occupy the place of the vesicles. On the seventh and the eighth, the crusts become detached and leave small red spots without depression on the skin, which remain for several days.

"During the course of this eruption, many of the elevations appear to become abortive; some remain in the state of simple spots or of popular elevations, and become gradually effaced; the others are only surmounted by a very small vesicle which is easily broken, or vanishes very quickly."*

The vesicles of chicken pox are not always preceded by a red spot on the skin; they are then true bullæ which become developed without a precursory local symptom. If I can form an opinion of this from the cases which I have collected and which are rather numerous, the vesicle becomes primarily formed in the majority of these cases without any previous alteration of the dermis. Thus, I have many times observed, in the midst of the ordinary eruption of chicken pox, vesicles, or rather

* Rayer. *Art. Varicelle. Dictionnaire de médecine et de chirurgie pratiques;* t. xv, p. 556.

bullæ, of rather larger size, rounded, filled with transparent serosity and without an areola of inflammation. This areola does not become established until two or three days after, at the period of desiccation and cure of the bullæ.

I am aware the difference is not of much importance; but it may be interesting to those who pay much attention to diseases of the skin, and who would be perfectly cognizant of their anatomical characters to recognize it.

Discrete chicken pox, is always a slight disease which scarcely affects the health of the children. When it is confluent it is accompanied by more or less intense fever which does not fail to diminish in proportion as the eruption disappears. The duration of chicken pox is from eight to fifteen days at most, and it only leaves behind slight traces on the surface of the skin.

Chicken pox presents itself under the epidemic form, as much in the course of epidemics of small pox as in the opposite circumstances. Thus, I have observed, at the Necker Hospital, an epidemic of chicken pox, at a time when there was no epidemic of small pox. The disease, confined in the wards for children, seized each of them successively and remained several months, for fresh children were admitted every day into the focus of infection, and did not fail to catch it. It commenced at the period when the slight epidemic of measles, the history of which will be given further on, ceased.

Chicken pox, like small pox, is contagious—it is no protection against the latter disease.

It may be transmitted by the inoculation of the serous humour of the vesicles, and although the experiments which I have performed do not confirm this opinion, they are not sufficiently numerous to invalidate the assertion of Willan, who declares that he has succeeded in its inoculation.

Chicken pox may produce small pox, and the latter may give birth to chicken pox (Rayer).

The diagnosis of chicken pox is not difficult. In fact, there is no cutaneous disease which presents the characteristic of chicken pox, scattered and isolated vesicles. It resembles pemphigus, when it appears in a primary manner as a small bulla not surrounded by an inflammatory circle; but the bullæ of pemphigus are always larger and more numerous than the bullæ of chicken pox. Besides, it does not prevent in a general manner the character of the bullous eruption just alluded to; on the same patient well-characterized vesicles are met with, which is not the case in pemphigus.

The treatment of chicken pox is very simple; the children should be protected from the cold and emollient diaphoretic drinks administered, without consideration as to the termination of the disease, which cannot be uncertain.

CHAPTER V.

ON SCARLATINA.

Scarlatina is a contagious, eruptive fever, characterized by the presence of a special exanthem under the form of red patches diffused over the skin and on the mucous membrane of the pharynx.

Causes.

Scarlatina is much more frequent than small pox in the first years of existence. No examples of it have ever been observed in the newly-born. It is scarcely observed until towards the end of the first year; but its maximum of frequency appears to be between five and ten years. This period passed, it becomes more and more rare. It is equally remarked amongst boys as amongst girls. It is an *epidemic* disease, especially in schools and in hospitals for children. It sometimes becomes developed *sporadically*. Scarlatina is *contagious* and is transmitted indirectly by the air, or in a more direct manner by contact, by the medium of linen and clothing which have been used by infected subjects, or lastly, by a lancet charged with blood taken from an active scarlatinous patch. Stoll, MM. Mandt and Miquel d'Amboise have at least declared this.

The necessary and absolute cause of scarlatina is the presence, in the interior of the organism, of a specific agent, of unknown nature, inappreciable, except by its results, and which has been termed the *scarlatinous virus*. It is this which is always reproduced in a form identical with itself, in the evolution of the same disease having the human body for its location and the skin for the place of development. *Scarlatina oritur a miasmate exteriore quod in aere volitat, aut contagione et contactu suscipitur.* It is thus that the illustrious Borsieri expressed himself, and we have nothing that can set aside these judicious words, confirmed by the observations of all ages.

Scarlatina shows itself under several forms, which should be described under the terms of *regular*, *irregular*, and *malignant*.

Symptoms.

The symptoms of regular scarlatina differ in the various stages of the disease; in the stage of *incubation*, *invasion*, *eruption*, and *desquamation*.

The young child submitted to the morbid influence which should ultimately lead to scarlatina resists the action of the virus for a

greater or less period. Several days elapse during which, in the midst of apparent health, the virus germinates in the economy, a variable time, differently estimated by authors, and which appears to me to vary between three and ten days. It is the *stage of incubation* of scarlatina. The fever then appears and indicates the *invasion* of the symptoms. It is accompanied by depression, or by considerable agitation and fretfulness; the breast of the mother or of the nurse is an object of disgust or of anger; drinks are swallowed with avidity, and one is at a loss what to do in order to calm the irritable child and make it sleep. Efforts of vomiting are repeated at intervals, sometimes vomiting takes place; the stools are either suppressed or deficient.

The tongue is white, dotted with red spots, the mouth warm; at the end of some hours, the pharynx and the tonsils become red and appear painful, for the children refuse to drink; angina may then be suspected, when the eruption appears it dissipates the doubts of the practitioner.

Sometimes the nervous agitation is most violent, and at the same time that the fever of invasion appears, an attack of convulsions commences the series of symptoms.

At the end of twelve, twenty-four, or forty-eight hours at most, the *eruption* appears and is first observed on the neck, then on the face and on the rest of the body.

Small red dots more or less numerous appear here and there, become multiplied and coalesce in enlarging so as to form patches of variable size with irregular edges, serrated, without being raised above the skin, and the colour of which momentarily disappears under the finger and returns as soon as the pressure has ceased. These patches are at first isolated, then become multiplied, coalesce, and become confluent, covering nearly the entire surface of the body with a scarlet tint.

The redness of this exanthem is always very decided; it often approaches the colour of raspberry juice, or of ripe mulberries, and it varies at different periods of the day. According to the observations of M. Rayer, it is of a deeper colour in the evening than in the morning at sunrise.

This eruption is usually diffused over all the body. It may, however, only cover one portion of it; the skin is sometimes at the same time covered with some papulæ, but more frequently with colourless and opaque vesicles, which constitute miliary scarlatina.

At the same time that the eruption occupies the skin, an eruption of the same, but much more serious nature, is developed in the mouth and pharynx. The mucous membrane of these parts is dotted, sometimes covered with flakes of lymph, or thin false membranes; the tongue is swollen, red, and quite deprived of epithelium at the edges; this constitutes *scarlatina anginosa*.

The skin is dry, very hot, and its temperature is slightly increased. M. Roger has observed it from 100° to 102° Fah. The fever remains as intense as in the first stage, and the pulse is always very quick and agitated.

At the end of two or three days the eruption begins to pale, and it gradually disappears at the same time as the miliary eruption dries and scales off. Then *desquamation* commences which lasts from six to ten days. It is sometimes very slight, but usually it leads to the renewal of the whole of the epidermis which is detached in the form of large flakes; whereas in measles, as we shall see, it is only a fine desquamation, termed furfuraceous.

Regular scarlatina appears under the form just described, and generally terminates favourably, when the children are at home and properly attended to. But in the hospitals for children, scarlatina, even when regular, is followed by serious complications which are very serious and cause the death of half the children attacked.

Scarlatina is said to be *irregular* when the symptoms of invasion are wanting or are but slightly marked, when the eruption is very pale, or very deep, black, hæmorrhagic; when no angina exists, or lastly, which is much more rare, when the eruption is entirely wanting.

There are cases in which the scarlatina is accompanied by convulsive and comatose phenomena from the commencement of the disease, and others where the scarlatinous angina is tranformed into laryngo-pharyngeal diphtheritis or into sphacelus of the mouth, which constitutes *malignant scarlatina.*

Scarlatina may be complicated by inflammation of the glands of the neck, described under the term of scarlatinous bubo; and on this subject we may remark that M. Mondière has seen a young child die from asphyxia in consequence of this inflammation. It is often complicated by broncho-pneumonia, by enteritis, and lastly by anasarca, in consequence of the disturbance of the cutaneous perspiration, and of the anatomical change in the kidneys known under the name of Bright's disease. This last complication is a very serious one; it may disappear at the end of some weeks, but when it is of long duration, it invariably causes death.

It is said that scarlatina may appear several times in the same individual. Examples of this are very rare, and for my part I have never met with one which could support the truth of the above observation.

[The following case is related by Dr. Mauthner (*Erster Jahres-Bericht über die wissenchaftlichen, &c.* 1851; p. 24). It occurred in a girl seven years of age, who for two years and a half had been brought up as a foundling by the mistress of a boarding house, and until now had remained quite well. Four days ago she came from school as pale as a corpse, became very hot and had pain of the neck; during

the night delirium supervened. At home a cataplasm was applied to the neck and a purgative given. As she got worse, however, she was brought to the hospital on the 20th of October, and was immediately received into the clinical department. The patient seemed strong and well developed for her years, had brown hair, was quite unconscious and delirious; the breath was very offensive; the balls of the eyes rolled outwards, their whites finely and brightly injected, and the cheeks were circumscribedly reddened. The mouth was half open, the lips and gums brown and dry, the teeth dull and brownish, the tongue very red, the tonsils and papillæ of the tongue greatly swollen, the breathing short, and a hacking loose cough was present. On the left side, from above downwards, the sound on percussion was dull, and the respiration bronchial with mucous rattle. There was nothing abnormal as respected the abdomen, the skin was cool, the fingers and toes were blue and cold, the pulse was small, rather hard, 100.

After the attention of the students had been directed to the important fact that the child had become ill without any premonitions, that she had probably brought the malady from school, and that a simple pneumonia does not prove fatal in four days, it was decided that the anginose conditions, the colour and state of the tongue, appeared to indicate *scarlatina perniciosa* to be the right diagnosis. The disease ran a course of a month and the patient recovered. No exanthem made its appearance, but about the seventeenth day desquamation of the skin ensued and continued for more than a week; ischuria also occurred.—P.H.B.]

Diagnosis.

The diagnosis of scarlatina is difficult at the commencement of the fever of invasion, for then the first symptoms resemble those of other eruptive fevers. It is only after twenty-four or thirty-six hours that it is probable to foresee the evil which is about to appear when the disease of the throat sets in, and soon after, the eruption, under the form of bright red patches, with or without accompanying miliary eruptions. Thus then, fever, affection of the throat, redness of the pharynx, diffused eruption of deep colour, are the diagnostic points of scarlatina, whereas in measles, with fever, there is coryza, lachrymation, bronchial cough, and afterwards a rosy eruption composed of small irregular patches, more or less elevated, discrete or confluent. In small pox, the fever and vomitings are first observed, then the characteristic pustules, and lastly, if there is angina and bronchitis, it is consecutive to the eruption, while quite the contrary is the case in the two exanthemata just alluded to.

Prognosis.

The prognosis of scarlatina is less unfavourable in the city, and when it is developed in children of the middle classes than when it attacks the patients of the hospitals for children. The same holds good in all the diseases of children, and to believe on this head the statistical tables, compiled in hospitals dedicated to children, would be assuming a very false idea of their seriousness.

Scarlatina is a very fatal eruptive fever in children at the breast;

although it may terminate by resolution and by regular desquamation, it often originates immediate nervous symptoms, or ulterior symptoms, such as impetigo of the face and of the scalp, scarlatinous swellings of the neck, with or without suppuration, pseudo-membranous angina, gangrene of the mouth, enteritis, chronic bronchitis, tuberculization, anasarca, and albuminous nephritis, &c., &c. This is the case in instances of irregular and complicated scarlatina. When the disease is simple, its termination is constantly favourable; from the time that it presents irregularities or complications, life is immediately threatened, and the greater number of children die from it.

[The following abstract, from the Report of the Registrar General, shows the total number of deaths in London from scarlatina, during 1845-49, and the number of deaths in each quarter:

	1845.	1846.	1847.	1848.	1849.	Total of the quarters.
Quarter ending March . . .	421	221	195	615	776	2228
,, June . . .	201	177	174	816	497	1865
,, September . .	194	208	316	1560	386	2664
,, December . .	269	322	747	1765	486	3589
Total of the different years .	1085	928	1432	4756	2145	

P.H.B.]

Treatment.

The treatment of scarlatina is both prophylactic and curative.

The prophylactic treatment has for its aim the prevention of the development of the scarlatina in the case of an epidemic. This is accomplished by means of belladonna, administered in the form of tincture, in the dose of several drops in twenty-four hours. This is one of the most curious facts of modern therapeutics; the knowledge of it is due to the illustrious Hahnemann, whose observations leave little room for scepticism. They are, moreover, confirmed by a host of physicians, amongst whom we may mention Schenk, Massius, Hufeland, Berndt, Meglin, Bayle, Godelle of Soissons, Stevenard of Valenciennes, &c., who have made use of this remedy in several epidemics, and who maintain they have thus limited the number of victims. Bayle reports* that out of 2,027 individuals thus treated in an epidemic of scarlatina, only 79 were attacked, and 1,948 escaped. There are many facts of this kind accepted as true in medical science.

When belladonna is made use of as a prophylactic means against scarlatina, it should be administered in the following manner, as recommended by Berndt:

Extract of belladonna	1 grain.
Cannella water	℥ vj.

Two to three drops, morning and evening, for a child one year old, and one drop more for every year for children of more advanced age.

* *Bibliothèque de Thérapeutique.*

The greatest objection — but it is not one in our opinion — the greatest objection which can be made to this therapeutic means is, that it does not fulfil the purpose proposed, that, in a word, it is useless. However, this is a circumstance to be proved, and it has not been accomplished. Consequently the physician finds himself, at the period of an epidemic, in the dilemma either to allow the disease to seize many victims, or to administer an inoffensive substance which perhaps may diminish the number of them. There need be no hesitation, and if we perform a useless thing it should be done in the hope of a good result. It is only when we have several times failed ourselves, that we have acquired the right of abstaining from it.

Other physicians, MM. Lehmann and Miquel d'Amboise, have proposed the inoculation of scarlatina as a prophylactic means. They have thought that by originating a benign scarlatina, unconnected with the natural predisposition of the individuals, the symptoms which result from this most serious disease, developed under the epidemic influence, might be avoided.

Lastly, other physicians consider the isolation of the affected children the only possible prophylactic means. It is evident that apart from every other prophylactic procedure this is the best.

The curative treatment has for its aim, to favour the eruption and to combat the complications which may manifest themselves. It is different in regular scarlatina and in irregular scarlatina.

In regular and simple scarlatina, the treatment consists in moderately covering the patients, so as not to weaken them with fatigue and heat, and then to give them less to suck, or milk diluted with water, or emollient drinks.

If the inflammation of the throat is extensive, syrup of mulberries mixed with water should be given as a drink, and small mustard plasters applied to the legs.

In irregular and complicated scarlatina the practitioner should be carefully on guard for the slightest morbid manifestions, so as to treat them as soon as they appear. A leech should be applied behind each ear, if convulsions or coma indicate a violent sanguineous congestion of the meninges and of the brain; he may also have recourse to abstraction of blood, one leech only on each side beneath the jaw, in the case of too intense an inflammation of the throat and pharynx. If the angina is accompanied by lymph-like resisting pseudo-membranes, or if there is a commencement of gangrene of the pharynx, with fœtor of the mouth, the parts should be cauterized morning and evening, often three times a day, with a brush dipped in hydrochloric acid, or with a concentrated solution of nitrate of silver. As the details of this treatment will be found elsewhere, in the chapter devoted to

the treatment of pseudo-membranous angina, we shall not further describe it.

If the scarlatina is complicated with bronchitis, or with broncho-pneumonia, the two sides of the chest should be carefully auscultated, in order to define precisely the extent and the degree of the lesion, so as to treat it by the means usually applied to these inflammations. We have described them at some length under the head of the treatment of pneumonia; it is, therefore, useless to recapitulate them here.

To remedy the anasarca, dry frictions, with a flannel brush gently rubbed on the skin, should be made use of; tepid baths, aromatic baths, vapour baths, and internally every day calomel, three fourths of a grain in pill, or calomel in powder in the same dose, so as to produce a purgative effect. The medicine is then intermitted, to be again administered as soon as the diarrhœa has ceased.

[Dr. Walz (*Schmidt's Jahrbuch;* Ap., p. 166), has employed, after the manner of Schneeman, frictions with fat in seventy-four patients with scarlatina; all were cured. In sixty-nine cases there was no desquamation; in four cases there was secondary dropsy which was easily cured in one case by diaphoretics and three by sulphur.—P.H.B.]

[Dr. Behrend (*Constatt's Jahrb.;* 1850, p. 200) describes two forms of dropsy after scarlatina which are etiologically different. The first depends upon an inflamed state of the kidney *(hydrops nephriticus)*, and the other is produced as a consequence of anæmia *(h. anæmicus)*. The first of these may occur at an early or late period after the appearance of the exanthem, and the following is its order of manifestation as to frequency: œdema, ascites, hydrocardium, hydrothorax, and hydrocephalus. The œdema pulmonum and cerebri Dr. Behrend regards as part of the general œdema of the skin. The more considerable the œdema the less is the effusion into the serous membranes, and *vice versâ*—ascites being, however, an exception to this. The congestion of the kidney, giving rise to the *hydrops nephriticus*, is as specific an effect of the scarlatina poison as is the congestion of the skin and eruption itself. It induces exudation and hæmorrhage from rupture of the capillaries, both effusions mingling with the urine, which becomes of a dark chocolate colour. By means of the exudation, the small vessels and tubuli of the cortical substance are in part obliterated and in part compressed, a granular appearance resulting under the microscope; the capillaries are observed in part empty and in part filled with exudation globules, without any red blood, and hence assuming a whitish straw colour. A yet stronger pressure of blood and urine produces within the tubuli a separation and regeneration of epithelium, analogous to the eruption and desquamation of the surface; and, finally, albumen is separated with the urine. The impeded activity of the cortical substance of the kidney, which so much modifies the function of the tubuli, prevents the complete passage of urea from the blood, and the retention of it in this fluid combines with the scarlatina poison in inducing the narcotic-like symptoms, as coma, delirium, &c. It is to this deterioration of the blood by the urea, and the effort of the scarlatina poison to become eliminated by the cutis, that dropsical effusions are due; the effusions into the serous membranes being due to the former cause alone. The greater the activity of the organism the less is the danger of effusions, for it shows that the blood has, as yet, undergone no considerable deterioration. So long as the urine,

besides its albuminous contents, exhibits traces of blood extravasation, separated epithelium, and an acid reaction, the danger is less than if it were clear, phosphatic, and highly albuminous, because these last indicate a very considerable deterioration. In the blood-coloured, albuminous, and acid urine, treatment must be directed to diminish congestion and secure the elimination of the urea, for which purposes an antiphlogistic and saline diuretic treatment is indicated; but when the urine, from its large proportion of albumen, is of a whitish yellow colour, and ceases to exhibit the acid reaction, antiphlogistics must be laid aside, and we must act against the deterioration of the blood, and endeavour to augment its plasticity—iron and tonics being now necessary means. This treatment is also required when, in an anæmic child that has suffered from scarlatina, after a very slight eruption œdema has rapidly established itself. Even if the urine contains little or no albumen, yet so defective is the blood in plasticity that death may follow from this cause if means be not taken to avert it.—P.H.B.]

CHAPTER VI.

ON MEASLES.

Measles is a contagious exanthematous disease characterized by the presence of small red patches, usually isolated, sometimes coalescing so as to form larger and irregular blotches, projecting on some points to the surface of the cutaneous follicles, and separated by irregular interspaces, between which the skin preserves its natural colour. This exanthem is always accompanied by an affection of the nasal, ocular, and bronchial mucous membranes, revealed by sneezings, lachrymation, and obstinate cough, which so very much harasses the children. The eruption lasts from five to six days and disappears. It is usually followed by a furfuraceous desquamation of the epidermis.

There are several varieties of measles, one which has received the name of *common measles*, in consequence of its frequency and of the constant uniformity of its symptoms. The others which are infinitely more rare and which differ from the above either in the nature and in the colour of the eruption, as pimpled measles, and black measles *(rubeola nigra)*; or in the symptoms, as measles without catarrh, malignant measles, &c. These constitute *anomalous measles*.

On Common Measles.

The characteristics of this variety of measles may be estimated from the description of an epidemic which invaded the Necker Hospital in the course of the year 1843.*

This disease has presented us the curious picture of an epidemic and contagious disease confined to the very spot of its birth. It was

* See the essay published by Professor Trousseau on this epidemic. *Journal de Médicine;* September, 1843.

limited to the place of its appearance, and respected the patients of the adjoining wards. This peculiarity is valuable, as it allows me to collect all that relates to the facts of which I would speak; it permits me, besides, to give a complete description of the epidemic, which generally presents inappreciable difficulties when it is observed in the midst of a large city.

In fact it is almost impossible, in a large city, to appreciate properly and to specify with exactness the most important peculiarities, and sometimes even the general forms of an epidemic. The *ensemble* of the description is necessarily confused; for the number of patients is too great, the facts are too disseminated, and many are lost to the observer.

If, on the contrary, we are situated in a small locality, in a village, in a hamlet composed of several houses, the disease will be observed to appear and increase; those whom it spares will be noticed, and its victims may be reckoned up, for nothing can escape. After having assisted at the birth of the epidemic and after having followed it in its course, it will then be observed to dwindle away, or, surmounting space, afflict other localities and there determine the same ravages as in the districts it has abandoned.

For him who would devote himself to useful researches on epidemic or contagious diseases, there is not, in my opinion, a more interesting and promising study than that which results from attention, backed by intelligence, on a well circumscribed field. In this manner proceeded the learned physicians who, in this age, have traced for us the history of the diphtheritic or pseudo-membranous angina of the small villages of Sologne, and have pointed out to us its epidemic nature and its contagious properties.

I shall first give a cursory glance at the origin of the general aspect of this epidemic of measles; I shall then point out the characters and the progress of the exanthem, its duration, termination, mentioning the general symptoms which accompanied its evolution. I shall consider in detail the causes and some of the complications of this disease, and I shall terminate by a consideration of the treatment appropriate to it.

Description of the epidemic. At the time when measles committed ravages in the city and in the hospitals devoted to children, a nurse was admitted into the Necker Hospital, bringing with her a child, eighteen months old, at the seventh day of measles which it had caught at the Foundling Hospital. The measles was complicated with very serious lobular pneumonia.

This child was placed in the midst of a ward then occupied by nine other small children. One only had had measles; the others were then disposed to catch it. I am going to describe what they suffered from this proximity.

Twelve days afterwards, in the same night, and after rather vague

premonitory symptoms, five of them were seized by measles; on the twenty-fifth and on the twenty-seventh day, two others were attacked, and they presented, during four days, well-characterized premonitory symptoms. Of the two which remained, one had had measles, and the other was taken away by its mother at the time of vaccinal fever; it had at her home a secondary vaccinal eruption similar to varioloid, as far as M. Trousseau and myself could judge, when the patient was brought back to us.

During the evolutions of the measles in this ward, that is to say for two months, a considerable number of children occupied the vacant cradles. Out of this number, that is to say out of seventeen children, two only were attacked by the disease, the first after twenty-one, and the other after twenty-nine days in this focus of infection.

After this period, fresh patients were admitted and none of them were attacked by measles; the virus was exhausted. It did not extend beyond the limits of the ward, and a simple partition of planks sufficed to preserve the neighbouring wards from it.

Thus, of nine children at first placed in conditions favourable to the development of measles, seven were attacked by this disease. There were only two seized out of the number of those which afterwards occupied the ward to the termination of the epidemic.

It is very interesting to follow this epidemic of measles in its progress. The measles is at first observed to appear after twelve days, then after twenty-one, twenty-five, twenty-six, and lastly after thirty-one days of incubation.

Its invasion was almost instantaneous amongst the children first attacked by it. It appeared during the night, in some hours, and it was only in the morning that the mothers, surprised at finding their nursling in such a state, on turning their attention to it, remembered that the day before the child was dull, a little restless, that the eyes were red and that it had sometimes sneezed. Such were the premonitory symptoms, evidently uncertain, which appeared amongst our first patients.

The same was not the case with the others. The incubation was long and complete, and the eruption of the exanthem was preceded by fever, coryza and lachrymation, symptoms which, in our opinion, are unequivocal.

When the exanthem appeared, it was announced by small red patches situated on the chin, neck, and face, afterwards diffused over the rest of the body, and coalescing so as to form blotches of large size and more evident until their disappearance, which took place on the fourteenth or sixteenth day. To these patches a slightly apparent furfuraceous desquamation succeeded in some children, and in all brownish ecchymosed patches of which we shall speak again further on.

The exanthem was accompanied in all our little patients by a rather intense fever, which was especially very intense in the children first seized.

All were affected by coryza, with frequent sneezings, redness of the conjunctivæ, swelling of the eyelids with abundant secretion of tears.

Some were attacked with efforts of vomiting and slight diarrhœa which had not unfavourable consequences.

Lastly, amongst others the cough and bronchitis of measles were observed. Of these last, we may mention under the head of complication, two examples of hooping cough and three examples of the pneumonia of measles, upon which we propose to say something further in a special chapter.

This outline is sufficient, I think, to give a clear and precise idea of the epidemic and of the facts which we have to study; we are now going to consider them more in detail.

Symptoms.

Before speaking of the symptoms of the invasion of measles, we must evidently take into consideration the time that has elapsed between the moment of invasion and the probable instant of the infection.

So that, in place of the three stages admitted by most authors who have studied measles, we are obliged to recognize yet another which precedes them; this is the stage of incubation; it is easy to distinguish it in our patients. It commences on the day of the arrival of the child in the focus of the epidemic and ceases on the instant of the invasion of the symptoms of measles; I shall then successively describe the stage of incubation; the stage of invasion, *stadium contagii* (Rosen); the stage of eruption; and lastly, the stage of desquamation *(declinatio vel desquamatio)*.

1*st Stage. Stage of incubation.* Several physicians have already endeavoured to determine the probable duration of the incubation of measles. It would be from six to sixteen days according to Bateman; from eight to twenty-one days according to Gregory; from ten to sixteen days according to Willan; from six days according to Home, &c.

It may be readily imagined how difficult these approximations really are. It is often impossible to determine at what period the child is exposed to the focus of infection, and it is even unknown whether it is liable to contract this disease. Had we not been placed in the circumstances we were when this epidemic appeared, we should only have arrived at uncertain results.

As in the present instance, it is necessary to see a child attacked with measles arrive in the midst of a greater or less assemblage of other children. Then, by attentively observing what is going on, we can

accurately determine the time necessary for the development of the disease amongst those which had any aptitude to contract it. If there are differences in the time of incubation, they must be referred to peculiar predispositions.

The following was the duration of this stage of incubation in our children:

Five presented the first symptoms of measles at the end of twelve days. One after the twenty-first day. One after the twenty-fifth day. One after the twenty-sixth day. One after the twenty-ninth day.

It is then the same with the incubation of measles as with the incubation of other contagious diseases, it cannot possess the same duration in all the subjects. It would be presumptuous to define its limits precisely; it varies according to individuals and according to conditions which it is impossible to determine. Here the term predisposition starts up very opportunely in order to disguise our ignorance.

In fact, according to the predisposition of the subjects, some are rapidly seized upon by the epidemic, others are so at a much more distant epoch, or are even entirely spared by it. In other cases, it is upon the form itself of the disease that the predisposition seems to possess some influence, so that in one case a slight attack of measles is developed, in another a much more serious one.

To resume, then: in this epidemic the stage of incubation varied from twelve to twenty-nine days, a circumstance which can only be explained by a peculiar disposition of the children placed in the focus of infection.

2nd Stage. Stage of invasion. The stage of invasion was imperfectly characterized; in five of our children it elapsed almost imperceptibly, having scarcely lasted twelve hours. Indicated by restlessness, a little agitation at the approach of evening, slight redness of the eyes and some sneezings, it was the next day replaced by the stages of eruption. The patches of measles had appeared on the skin of the neck and the superior part of the body.

In the other children the precursory phenomena were more perfectly characterized; they lasted from three to four days, and permitted us to foretell the eruption. The fever was rather strong, accompanied by heat and dryness of the skin. The eyelids were inflamed, the eyes red and tearful. The patients sneezed as if they had caught cold and their nose distilled a serous liquid (Sydenham); the tongue was white, the buccal mucous membrane uniformly red, and I could not here detect the dotted red, peculiar colour, different from the redness of scarlatina, observed in other epidemics by MM. Stein, Marc d'Espine, Guersant, and Blache.

All these patients had a small dry, obstinate cough, which increased after the eruption.

Two of them had at several distinct times some efforts of vomiting and diarrhœa, a rather rare phenomenon in measles, particularly alluded to by Sydenham, and to which M. Trousseau has called attention in his treatise. Sydenham states that it is especially observed in children who are cutting their teeth. Our patients came under this category.

The duration of the precursory symptoms was four days; it appears that in some circumstances it may be a much longer time. M. Guersant cites a case in which these precursory symptoms announced fifteen days in advance, the eruption of measles, which was, moreover, very benign.

3rd Stage. Stage of eruption. At this period there appeared on the forehead and face of our patients small red patches, similar to flea-bites, which extended to the superior part of the body and on the limbs. They rapidly became larger and more numerous, so as to coalesce and form irregular groups, blotches of a crucial form or of different figures as Sydenham has pointed out. Moreover, the eruption was only confluent in four children; it was discrete in all the others.

These patches were slightly projecting at the moment of their appearance, but they soon subsided. Their colour was at first rather intense, they were of a fine rose tint, but they rapidly became pale; however, at the time of the efforts of coughing, they resumed all their intensity.

The symptoms of measles, observes Sydenham, do not become lessened by the eruption, like those of small pox. The cough, fever, difficulty of respiration increase; the lachrymation, the continual desire to sleep, and the anorexia continue as before.

In fact, in this third stage I recognized the general symptoms of the first. They had assumed much more intensity; the fever was constant and rather high, without being invariably very considerable, it appeared to us to be in relation with the discretion of the eruption of the measles; the mouth was very red, and so dry in many of the patients as to provoke frequent desire for drinking; the tongue was covered by a whitish coat, dotted with small red spots corresponding to the papillæ of the tongue; the abdomen remained soft and indolent; the diarrhœa continued in those children who had had it in the first stage, and appeared in two other patients. This symptom disappeared with the patches of eruption.

During all this stage, as in the first, swelling of the eyelids and redness of the eyes, which were filled with tears, were observed; the nasal flux continued, but its nature was slightly modified; it became converted into a compact mucus, which quickly became dry at the entrance of the nostrils, so as to form crusts there.

The obstinate cough became more aggravated, it was the most serious symptom of this stage; it was observed in all the children; it was accompanied in six of them by a very distressing dyspnœa.

The sibilant râle was heard in the chest, and the great mucous râle, which in two of these children became converted into the subcrepitant râle, which disappeared to give place to a souffle, as we shall describe in the section on the complications. In two of our patients, then, the cough was primarily allied to bronchitis, and consecutively to pneumonia.

In two others the cough was very obstinate; it returned in distressing fits, which might have been taken for attacks of hooping cough if there had been the characteristic hoop observed in this disease.

The duration of this stage was two days in four children and from six to eight days in the others. In the first we observed the patches of measles vanish in the order of their appearance, become pale, diminish in extent, and, finally, entirely disappear. The waning was rapid, as is usually observed in discrete measles. In the last the same was not the case; the eruption became much paler, but each patch of exanthem was replaced by a yellowish spot, a stain on the skin, which continued from fifteen to twenty days before disappearing. The general symptoms disappeared simultaneously with the eruption.

The stains which measles leaves behind it have been pointed out by several physicians, by MM. Guersant and Blache, M. Rayer, and by M. Trousseau in his treatise, where he expresses himself in the following manner:

"These marks occupy the spots where the redness of measles possessed the greatest intensity. But slightly apparent when the child is calm, they acquire a much more decided tint when the skin becomes coloured during the cries and agitation. They appear to occupy the dermis itself, for they do not disappear on pressure. Are these a species of ecchymosis? I do not presume to decide this question, but I may observe that they appeared to me to be allied to a form of measles, relatively rather serious."

For my own part, I consider these maculæ as the result of a local and circumscribed inflammation of the dermis, which has occasioned alteration of the cutaneous pigment. This opinion is founded on what takes place in persons little accustomed to support the heat of the sun, and who expose the unprotected head to the heat of its rays. There thence results a vivid redness of half of the face or of one of its parts, the nose, the forehead for example, a redness to which a yellow tint succeeds similar to the colour of the maculæ of measles. The colouring is of greater extent in the one case than in the other, which really matters little; it has in both cases the dermis for its seat, and, like the colouring of measles, it disappears after one or two weeks.

4th Stage. Stage of desquamation. In devoting a few lines to

this stage, that is to say, to the phenomena of desquamation, which were but slightly marked in our children, I had the intention of pointing out one of the differences which separate the actual epidemic of ordinary measles.

Most physicians describe the rapid or the tardy desquamation which succeed measles. They depict it with all differences which separate it from the desquamation of scarlet fever. Thus, in the attack of measles, the epidermis of the parts where the patches are situated peels of in very small bran-like flakes. The desquamation is especially visible on the face and on the upper part of the chest.

In several of our children the desquamation was not appreciable, or it escaped our attention.

Similar facts have been observed by Sydenham and Joseph Frank; which at least indicate that if the furfuraceous desquamation is usual, it is not a constant phenomenon.

I have only remarked it in four patients, precisely in those who had had the most confluent eruption.

The diminution of the general symptoms is entirely in relation with the disappearance of the patches of measles. The fever disappears and the skin resumes its natural temperature. The symptoms of congestion of the face vanish; the nasal and the lachrymal flux cease to flow. The cough is the only symptom which survives all the others. This was the case in our children, and especially in three of them which had consecutive pneumonia. We need not make mention of the transformation of the glairy and limpid expectoration into the mucous and purulent, nummular expectoration as M. Chomel has very justly pointed out; for this modification is only remarked in the second stage of childhood and in adults. What is there that can be said on the expectoration of young children, but that this phenomenon is wanting at this age?

Progress.

The present epidemic of measles presented itself to us with characters which, for the time, lead to the supposition that it would be very fatal. In fact, twelve days after the arrival of the germ which diffused the infection in the ward, five children were suddenly seized with the disease. Would one not have conceived that after these appearances, that it was about to commit its ravages furiously? This was not the case. The contagious principle appeared to become weakened in becoming divided. After this first manifestation of its existence, there was a pause of fourteen days, after which it selected two fresh victims; then, being again moderated, it broke out afresh in order to let fall its last stroke on two of the newly-arrived in the circle of its action. It was thenceforth powerless; its effects were useless, and

we question ourselves, without being able to account for it, how it could happen that so vast a focus of contagion became extinguished, when a single spark was sufficient to relume it.

Physicians who have directed their attention to the progress of epidemic diseases are accustomed to similar anomalies. They are so common that they are everywhere alluded to, and M. Piorry has, in his excellent report on epidemics, justly insisted on these individual immunities.

The progress of the measles, separately considered, was natural enough, and much resembled the progress of this disease in ordinary cases. The first stage did not present anything but what was well known and already mentioned in this work. The eruption was generally discrete, and although in three patients we have thought proper to indicate it as being confluent, it did not present this character with all the intensity of which it is susceptible.

These are precisely the patients in which the pneumonia of measles succeeds bronchitis.

In point of fact, there was no observable difference between these measles and ordinary measles, except a modification in the period of the disease. The furfuraceous desquamation which succeeded this eruptive fever was but slightly marked in most of the children. In five of them it was impossible to detect it.

Duration.

All the difficulties of fixing a limit to this epidemic, so as to decide upon its duration, which at the time besieged me, will be doubtless understood. The origin is certain, it appeared on the 29th of June, the day of the admission of the unfortunate child who carried the infection of measles to us. At what epoch must its last term be fixed? This is a much more difficult thing to decide precisely.

Would this be at the twenty-first day of the month of August, the very day of the appearance of the symptoms in the last child who was attacked? Certainly not, for then the focus of infection was still in full activity, and it was not known whether there would not be fresh victims.

Neither would it be on the day of the termination of the disease in this last case of eruptive fever, for then the emanations of measles were yet of a nature to propagate the disease.

In order to determine the termination of the epidemic we must then be assured that the focus of infection is decidedly quite extinguished. However, if we recollect that, in measles, the mean time of incubation is from fourteen to sixteen days, and we allow this period to elapse after the cure of the last patient attacked by the epidemic, it is not probable that the disease will develop itself afresh. I say probable,

for on this point there cannot be any possible certainty. We may reasonably suppose that the contagious principle is destroyed, that the focus of infection is extinguished, but the affirmation cannot extend further.

The last patient was cured on the 29th of August; we will allow time to elapse to the 15th of September, in order to await the results. As at this period no case of measles appeared, we judge that the epidemic has ceased. It has then lasted from the 29th of June to the 15th of September, that is to say, seventy-seven days.

Thus it was as regards the duration of the epidemic, let us now estimate the duration of the measles. From the period of the invasion of the precursory symptoms to the disappearance of the exanthem and to the cessation of the general symptoms, this eruptive fever lasted from four to eleven days. I lay aside for the time, the stage consecutive to the eruption, during which the skin presented the yellow stains to which we have referred. This would lengthen out the duration of the attack of measles to several weeks.

Complications.

Amongst the complications which appear in our children in the course and at the termination of their measles, there were some which are perfectly in relation with the disease; but there are others which only appeared as morbid coincidences. I am about to establish these differences.

Two children had diarrhœa. In one, who had general good health, we may consider it, with Sydenham, as a critical phenomenon. In the other, on the contrary, who was feeble and of bad constitution, a patient at the hospital for several months with entero-colitis, the diarrhœa, which had preceded the measles, accompanied it in its progress, and survived it; it was evidently less in relation with the attack of measles than with the inflammation of the bowels.

Two other patients had, at the termination of their measles, secondary eruptions; one had boils on the body and a confluent eruption of impetiginoid eczema on the face. It is possible that this complication might result from the epidemic; however, as this is not very evident, I shall not discuss it further. The other child had also a similar eruption on the eyelids and face, with inflammation of the cervical glands, which ended in suppuration; but in this case there was eczema of the scalp, which existed previous to the eruptive fever; it extended to the face; it was this which determined the suppuration of the glands of the neck, a common circumstance in strumous children. This eruption appeared to me to be allied to the state of the constitution, and the measles exercised no other influence except that of communicating to it an activity which it had lost.

The obstinate cough was the most frequent complication in this epidemic; it existed in all degrees in all the children. It is, as is well known, the most troublesome phenomenon of measles; it is in relation with the inflammation of the bronchi.

When the cough is transient, and when the bronchitis only exists to a trivial extent, as was observed in three of our children, the disease requires little attention; if the bronchitis increases, the state of the patients must be carefully watched. Auscultation is of great service in order to discover the extent of the inflammation; on both sides of the chest are heard musical râles, wheezing, the sonorous râle, the sibilant râle mixed with the mucous râle, which readily shifts its position, and increases or disappears with the efforts of coughing.

It is then that it becomes necessary to investigate carefully the morbid phenomena developed in the chest. The catarrh of measles very readily passes into the state of pneumonia. This transition should be followed and seized at its commencement, if we would treat it successfully. Three times, in this epidemic, pneumonia appeared, and three times it has been successfully treated; in two cases especially the cure was remarkable. The inflammation of the pulmonary parenchyma was characterized by dulness of a lobe of the lung, by souffle, and by resounding of the cry. In the third, the pneumonia may be regarded as doubtful; it was not at all accompanied by bronchial souffle; it was only indicated by a double mucous râle, and by a subcrepitant râle on one side. Those who are conversant with diseases of children at the breast are well aware that no more is often required to characterize a lobular pneumonia.

These examples of the pneumonia of measles, which I have just mentioned under the head of complications, presented to me symptoms identical with those of the pneumonia of children of the same age. It was necessary to refer to them so as to leave no gap in my description; but it is useless to dwell longer on this point.

If I would indistinctly range amongst the complications of measles all the diseases which appear in its course or which succeed it, hooping cough must be included. In fact, two of our patients had, after the disappearance of the exanthem, an exacerbation of cough, which become convulsive, and appeared in fits like hooping cough, with the exception always of the hoop, which was ill characterized.

I shall not, however, abuse the results of observation and the coincidences which might lead to the admission of a fact which reason hardly allows. To measles I shall not refer these fits of convulsive cough, which I look upon as accidental nervous phenomena, grafted on the catarrh of measles, and I shall refer them to the impressionable disposition of the subject rather than to the epidemic influence.

Diagnosis.

The eye cannot be too much accustomed to the external forms of diseases. A great number of them betray themselves externally by signs which it is impossible for the practical physician to mistake. Thus measles, the uncommon anomalous varieties excepted, is easy to distinguish at a distance. From its commencement it is much more readily recognized than any other eruptive fever.

All the cases observed in the course of this epidemic, leave nothing to be desired in relation to the diagnosis. The fever, congestion of the face, flow of tears, sneezings, indicate the appearance of the disease; nothing more was really required. The persistence of these symptoms, the cough and the appearance of the exanthem, confirmed its existence. There was no other disease which could be confounded with it, or, if you will, with that which we have just so lightly touched upon.

Prognosis.

Epidemic measles is generally much more serious than measles manifested in an isolated manner; but here we can scarcely complain; none of the children attacked in our ward died. The discreteness of the exanthem might have foretold this result; however, the life of several of our children was seriously compromised by an intercurrent thoracic affection. It is this complication which renders the affection of measles so formidable in a great number of cases; without it, measles would be easily cured in the great majority of children.

I cannot do better, in order to complete what relates to the prognosis of measles in this epidemic, than to report the words of the master whose practice I have followed. "There is a prejudice spread amongst physicians, and especially in families; it is, that measles and scarlatina are much less fatal in proportion as the exanthem is more confluent. It is a matter of great consequence most distinctly to assert that this is a serious and fatal mistake, for the confluence of the eruption is as fatal in measles and scarlatina as in small pox. In this respect, our little patients were subject to the common rule; all those in whom the eruption was discrete were easily cured, and presented no bad symptoms. Three of those in whom the eruption was confluent had very serious pneumonia; and what I have observed here in the limited epidemic which has just appeared in one of our wards, I have also remarked in my practice. This is more especially evident in scarlatina; for while the scarlatinous eruptions which manifested themselves only at the throat, and which scarcely appeared on the skin, in general possess little fatality; those on the contrary, in which a deep redness and tumefaction of the skin are observed, are as fatal as the cases of very confluent small pox."

[The following abstract, from the Report of the Registrar General, shows the total number of deaths in London from measles, during 1845-49, and the number of deaths in each quarter:

	1845.	1846.	1847.	1848.	1849.	Total of the quarters.
Quarter ending March . . .	381	401	99	465	173	1519
,, June	322	163	277	306	368	1436
,, September . .	688	78	521	154	274	1715
,, December . .	927	105	881	218	338	2469
Total of the different years . .	2318	747	1778	1143	1153	

P.H.B.]

Causes.

It is often a very difficult matter to specify the causes of the epidemics which break out in populous cities. We are compelled to invoke in a vague manner the more or less frequent modifications of temperature, and the changes in the composition of the atmosphere; we are lost in conjectures, and in fact the impotence of our researches must be confessed. Save in rare exceptions, it is impossible to discover the cause of the epidemic, and often to demonstrate its origin.

This is easily understood, and it cannot be otherwise in large cities. How is one to discover, in Paris, if a child, attacked with measles to-day, has not been in more or less distant contact with another child labouring under this disease? In what way can it be learnt whether it has been near a focus of infection? Is it possible? Assuredly not. And the same holds good for a great number of other epidemic diseases.

How many diseases of this nature, determined by contagion, have been looked upon by physicians as sporadic diseases? These mistakes occur daily, and there is no one who can flatter himself that he has never committed them.

It is because the field of observation is so vast, that the mind of man cannot embrace it. In order to study advantageously the progress of an epidemic, and to give a proper description of it, it is necessary to be located in a circumscribed spot whence all can be observed and everything appreciated. Then, as M. Chomel has pointed out, the source of the first symptoms is discovered; they are followed in their manifestations on all the persons submitted to the infectious influence, and they are observed to disappear for ever, or to reproduce themselves in other places. The enumeration of the population is easy, and the work is completed by estimating the number of victims in order to compare it with the number of persons who have enjoyed immunity.

These preliminary considerations were necessary in order to show all the advantage science should derive from the study of epidemics in circumscribed localities. These advantages have already found eloquent defenders in MM. Bouillaud, Chomel, Trousseau, &c., who, in special researches, or in articles of scientific treatises, have broached these considerations.

The origin of the epidemic of measles which spread through one of the wards of the Necker Hospital cannot be doubtful. It recognized as its cause the arrival of a child attacked with this disease. Its development is the result of contagion.

The circle around this child was a large one; no one but ourselves dared approach it; there could then have been no direct transmission to the other patients.

But what avails distance? The affection of measles is one of the epidemic diseases which spread the infection afar without direct contact being necessary. It throws out around it and in its wake impalpable emanations which poison those who breathe them. The contagion operates in a space and to an extent which it is impossible to appreciate. It is this variety of contagion which the epidemiographists have termed mediate or indirect contagion.

Here the circumstances occurred in the following manner: shortly after the arrival of a patient affected with measles in a ward where other children were, a great number of them, without having communicated with the patient, were attacked with this disease. The arrival of the first child must be properly considered as the cause of all the evil, and, in a word, as the origin of the epidemic which attacked all the children, with the exception of one alone, placed in the midst of the focus of infection.

This epidemic, originating from contagion, enclosed in four walls, could not be subjected to speculations, otherwise excellent, made in order to explain its causes, from the study of the temperature and of the composition of the air, of the direction of the winds and of the electrical condition of the atmosphere. These researches, which Hippocrates and many physicians have thought so important, appear to us, at least, superfluous in this case. The following is in proof:

Two wards are adjoining, separated by a slight partition; both look upon the same garden; they possess the same atmosphere, the same temperature, the same wind, and the same electricity. Measles are developed in one and attack nearly the whole of its population, which is renewed and is then again ravaged. In the other it is not at all developed. Whence arises this anomaly? The external influences are, however, identical. If they possessed any influence over the appearance of the epidemic, we surely should have been able to have proved it. Their action having been null, may be considered as not having taken place, and we return to the contagion to which we have referred.

The demonstration of the existence of a cause is not sufficient, its action must be also explained. Thus, there can be no doubt that the virus of measles was diffused in the atmosphere at the time of the appearance of the epidemic. But I ask whence came this virus, and how did it

happen to become extinct? And with regard to the patients, I inquire with the aim of discovering how it is that some have been preserved from, and others seized with, measles, at the end of a variable time? This, in a word, constitutes the history of the predisposition.

Let us first speak of the virus, which will soon be disposed of. Although impalpable, its existence is certain and generally admitted. In this epidemic it appeared to us to possess an incessantly decreasing action. In fact, the entire population of the ward, with the exception of two children, were attacked. Of the fresh patients who came to replace the first, two only, as we have seen, caught the measles at long intervals, and then it entirely ceased. May it not be the same with the virus which strikes at a distance as with the virus with which we inoculate, and may we not believe that it becomes weakened by division? I think so, and compare the action of the virus of measles absorbed through the medium of the lungs or of the skin to a true inoculation. The child attacked with measles poisons a certain number of those who surround it, because it has formd a focus of considerable infection. To the second generation this focus is less; it is still more diminished to the third, and to such an extent to the fourth perhaps, as to disappear entirely. I only put forward these ideas as hypotheses to which slight importance must be attached; but they appear to me to account for the disappearance of an epidemic which is developed in a hospital, a boarding house, or in any other locality. It is for this reason that I have thought it right to advance them.

If we take into consideration the virus which infects the patients, we should also refer to the resistance possessed by the patients to the action of the virus.

The period of incubation was not the same in all the children. It varied from twelve to twenty-one, twenty-five, twenty-six, and twenty-nine days, according to the subject.

One child, at the commencement of the epidemic, was not attacked by it. And the same was observed in a great number of others towards its termination.

These differences in the appearance of the disease and in the resistance to contract it, are the result of the weakness of the virus or of the predisposition of the children. As all respecting the virus is but hypothesis, we shall not return to it; but the predisposition of the subjects is much more important to mention.

It is evident that children owe to individual predisposition the immunity which they enjoy in the midst of a focus of infection. It is an inexplicable phenomenon, it is true, but it is admitted by all authors, and is found justified by a great number of observations made in all epidemics. Alone, it may account for the greater or less time which the disease takes to develop itself in children submitted at the

same time to the contagious influence. We may add that, according to M. Guersant, it is necessary, together with the natural predisposition, to take into consideration the accidental disposition of the individuals. Thus, and I consider this remark very well founded, the subjects attacked with a disease whilst they remain in the focus of infection, are less submitted to the influence of the contagious principle. This is what has happened to several of our children, and it is this which may explain the very remarkable differences of incubation which we have cited. The same is the case with most of the patients whose cases are cited as very extraordinary, and who have not been attacked, in the wards of a hospital where measles reigns epidemically, until the end of forty, fifty, and even sixty days.

To recapitulate, then: this epidemic of measles was produced by the transmission of a contagious principle of the same nature, which germinated in our ward and ravaged it on all sides. Its progress was modified by the natural predisposition, perfectly normal, of certain children, and the predisposition which the morbid state had afforded to many others.

Treatment.

The treatment made use of in the course of this epidemic of measles was very simple. Most of the children had a discrete, regular eruption, exempt from complications. It was not deemed right to interfere with the natural progress of the disease. We left to the organic powers their entire liberty of action, which should be always done in benign and regular measles.

Energetic medicines, which are necessarily perturbative, are only suitable to diseases whose issue is uncertain, probably unfavourable, and in which we would make certain of the cure by the power of art. In measles these medicines are only applicable in certain complications, to which we shall refer further on.

In all the children in whom the eruption was regular we merely attended to the regimen and the hygienic precautions indicated by Sydenham and by all physicians.

Our patients were confined to bed during the two first days of the eruption, without more than the accustomed covering, and the apartment was not more warmed than when they were in good health. Sweetened emollient drinks were administered, many were satisfied with the breast of their nurse. No food of any kind was given them.

Attention to these points is very important, which it would be very wrong to neglect. The precaution of not covering the patients too much is especially necessary. It was the custom to heap coverings over them in order to facilitate the eruption of the measles, and thence such a congestion of the skin resulted that it became the seat of a fresh eruption, which caused great suffering to the children.

In the stage of the invasion of measles, the means we have just pointed out are the only useful ones. From this period the relation of the cough to the thoracic lesions should be watched, in order to treat the pulmonary inflammation from its commencement, if it is about to declare itself. When the cough is only a troublesome symptom in this stage, we should administer, according to the advice of Sydenham, the syrup of poppies, either in a draught or in a ptisan, in the dose of ʒ ss to ʒ vj in the twenty-four hours.

The stage of eruption does not require a plan of treatment different from that of the preceding stage. Some physicians have recommended the use of diaphoretic drinks, and have advised the children to be kept in the midst of a rather elevated temperature. These means are useless, and I even consider them injurious. We have not made use of them.

When the eruption comes out with difficulty or suddenly disappears, and when symptoms succeed this disappearance, we should endeavour to recal the exanthem. Urtication, recommended by M. Trousseau, irritant frictions on the body, sinapisms, blisters, &c., are the proper means in this case.

In the stage of decline we have also remained the simple observers of nature; in several patients only, the cough becoming troublesome, we have endeavoured to calm it with mucilaginous draughts and the use of emollient drinks.

After measles, some physicians give a purgative to the children, because, say they, the diarrhœa which appears naturally in some patients is an advantageous critical phenomenon, and that when the crisis has not taken place it should be brought on by means of a laxative.

We have not followed this practice. M. Trousseau, without finding inconvenience resulting from it, has not judged it necessary. We have confined ourselves to keeping the patients sheltered from the external air and allowing them gradually to resume their usual food.

It is of the highest importance that patients convalescent from measles should not go out of doors too soon, if we would not let them run the risk of catching a pulmonary inflammation.

The treatment we have just mentioned, and which was adopted in most of our children, necessarily required some modifications in those who were attacked by the intercurrent diseases mentioned in the chapter on complications.

Pulmonary inflammation, the most frequent of the diseases which supervene in the course of measles, was observed in three children. It was treated from its commencement by ipecacuanha in an emetic dose. This substance possesses great advantages in the treatment of children at the breast, for it facilitates the expectoration, which is impossible at this age. It is important to fulfil this indication at the

commencement of the inflammation, the progress of which may in this manner be arrested. The vomiting has as its material and immediate result the diminution of the bronchial obstruction, and as its more distant result, the diminution of the pulmonary congestion by rendering hæmatosis more easy.

The ipecacuanha was given in the dose of from four to six grains in an ounce of syrup. It should be repeated in those children who have not been sufficiently evacuated and who have only experienced a slight relief. This means is not only proper in the pneumonia of measles, but also in the other varieties of pneumonia of children at the breast.

Immediately after the administration of the emetic the revulsive cutaneous medication should be put in use, as is pointed out in our observations. The ordinary blister, frequently repeated, the raising of the epidermis by means of croton oil, &c., were employed with success.

In no case did we find any indication for the employment of bleeding. The patients were not very vigorous, and the febrile reaction was not very great. However, we do not hesitate to recommend this plan of treatment, which has succeeded with us in other circumstances, and which Sydenham adopts in the most formal manner: "If, however, the patient, from the use of cordials, or from a hot regimen, be in a condition which is by no means unfrequent after the departure of the measles; *i.e.*, if his life be endangered from the violence of a fever, from difficulty of breathing, or from any other symptom of a peripneumony, I take blood from the arm, and I do it with remarkable success. The bleeding is proportionate to the age; but it can be applied even to infants. At times I have even repeated it."* Moreover, he says, we should not wonder that he recommends bleeding in tender infants, for his experience has taught him that it is as safe in them as in adults. "Indeed, so necessary is it in some cases, that, in respect to these particular symptoms, and in respect to some others as well, infants cannot be cured without it."

In our patients, we administered internally the oxysulphuret of antimony in the dose of half a grain, and during the cure, flying blisters were applied.

The irritation of the bowels and the diarrhœa which is the consequence of it, were observed in several children, but without presenting sufficient intensity to necessitate an energetic medication. Two of these children had only slight and unimportant indisposition; the other had diarrhœa previously to the invasion of the measles.

In these cases, emollient enemata, enemata of the decoction of rhatany root, or of solution of nitrate of silver, one grain to four ounces of distilled water, are usefully employed. The same

* The works of Sydenham; vol. i, p. 185.

substances may be prescribed internally and the nitrate of silver in the dose of .15 of a grain only. Sydenham employed bleeding, which he states as the only remedy in a like case. This author has probably somewhat exaggerated the advantages of this excellent means; one is inclined to this belief when he is observed to justify its employment in stating that it causes a revulsion of the sharp humours which cause the diarrhœa, and that it reduces the blood to its proper temperature.

In the hooping cough which succeeded measles in two of our children, Dover's powder and ipecacuanha were given at different times. I very much regret the opportunity of verifying the last aphorism which I shall derive from Sydenham, and in which he also vaunts the success of bleeding in hooping cough: "Bleeding affords immense relief in the hooping cough of infants. Here it leaves far behind it all pectoral remedies whatsoever.

Several children also presented during measles, or as a consequence of it, inflammation of the eyelids which became easily changed into eczema. This was the case in a child who was speedily cured by the use of the red precipitate ointment. Another was attacked by otorrhœa which quickly ceased, and for which we ordered injections with balm.

It is useless here to speak of the treatment of anomalous measles, to which we shall soon refer. I am about to terminate this chapter by mentioning the prophylactic treatment of measles. But what can be said on this point? I perceive that I should have commenced with this, and have ingenuously repeated, with all authors, that if we would not catch measles we should not expose ourselves to take them.

With regard to the preservative means against this disease, inoculation is the only one which, at present, has seriously occupied the attention of physicians. The internal use of certain medicines has been entirely rejected. Inoculation, especially at the period of epidemics, appears to possess great advantages; but this question requires to be cleared up by fresh experiments. They must be repeated afresh before we can decide in a positive manner.

[Dr. Walz has employed frictions with fat in three hundred and forty-three cases of measles, fifty-seven of which were severe; all were cured very speedily. In thirty of these cases the patients were tuberculous, and the progress of the phthisis was arrested.—*Schmidt's Jahrbuch;* Ap.—P.H.B.]

2. On Anomalous Measles.

These measles differ from common measles, by the functional and anatomical symptoms which they present. Thus, certain children attacked with measles have neither bronchial catarrh nor morbillous

ophthalmia; others present very intense general febrile symptoms and very serious nervous phenomena. There are some who present a singular eruption of measles, characterized by an exanthem of a very deep colour and nearly black, sprinkled, in some subjects, with cutaneous ecchymoses, true hæmorrhage of the skin similar to that of *purpura simplex*, dotted in others with a great number of projecting patches, as if papular. In one case the eruption appears very rapidly and vanishes almost immediately after its appearance; in another, it does not appear at all, and yet all the symptoms of measles are observed in the patients.

As will be observed, the affection of measles presents a great number of modifications which it is important to recognize, and they cannot be studied with too much attention, in order that we may avoid forming an erroneous diagnosis.

Rubeola without catarrh (*rubeola sine catarrho; spuria vel incocta*—Willan) is especially met with in epidemics of measles. Children are observed who present an eruption, the external appearance and the progress of which are the same as those of common measles. It appears, according to Willan, that an interval of some months sometimes separates this eruption from the development of common measles, but most frequently this manifests itself three or four days after the non-febrile eruption. M. Rayer has several times met with this measles without catarrh. "He has observed several children of the same family, inhabiting the some room, often sleeping in the same apartment, to be attacked with very decided catarrhal measles, with the exception of one of them alone, in whom this disease presented the symptoms of the first stage of measles and those of the eruption, less the phenomena of bronchitis. These measles *without catarrh*, considered as the effect of an epidemic cause, are they not analogous to the cases of varicella observed in the epidemics of small pox? It is difficult to distinguish the measles witnout catarrh from certain cases of roseola, otherwise than by their cause; all distinction between them is impossible when they are sporadic."*

Malignant measles are those which are distinguished by the intensity of their general febrile symptoms, or which are accompanied by very serious nervous phenomena, such as convulsions. They are very rare.

Black measles (*rubeola nigra*—Willan) are characterized by an eruption, the colour of which is of such intensity that it approaches a black colour. It is accompanied by a considerable depression of the strength and of the pulse, and is especially observed in children of a pale complexion. At the same time, cutaneous hæmorrhages similar to those of *purpura simplex* are sometimes observed. This is what has been termed *hæmorrhagic measles*. Dr. Thompson relates that

* Rayer. *Art. Rougeole. Dictionnaire de médicine et de chirurgie pratiques*; t. xv, p. 817.

in a case of black measles, the epidermis became detached from the skin on the least pressure and could be raised with great facility.

In some children the measles comes out imperfectly, it appears on one part of the body or is tardy in appearing, and sometimes, after having manifested itself, it immediately disappears. This is what has been termed *anomalous measles*, properly so called. This variety is very unfavourable, for it is often accompanied by convulsive nervous symptoms or with functional derangements on the part of the stomach.

Finally, the last variety of measles of which we have to speak, is the *measles without eruption*, *febris morbillosa*, the existence of which has been very wrongly denied by many physicians. It is especially observed in the time of an epidemic. Certain children have fever, coryza, lachrymation, bronchial catarrh, but they have no eruption at all (Gregory, Guersant). Usually in a similar case, there is no well characterized eruption of measles; but several patches appear on the neck and on the shoulders which have the appearance of patches of measles. It is to this disease that the term of *febris morbillosa* given by Sydenham is to be applied.

On the immediate or distant Influence of Measles on the Health.

Measles is rather frequently the cause of very serious morbid symptoms. Lobular pneumonia, termed, by reason of the circumstances which preside over its development, *morbillous pneumonia*, is, as is known, very fatal. Diarrhœa is a less frequent symptom, but not less dangerous, for entero-colitis is often the consequence of it. Convulsions in measles are very often fatal.

The eruption of measles is sometimes the source of cutaneous affections of the ears, eyelids, or skin in general. It is often accompanied by vesicles similar to those of miliaria, by the bullæ of pemphigus, and especially by impetigo in scrofulous children. This last mentioned affection is that which is developed on the eyelids and behind the ears. It should be treated by slight purgatives and by astringent applications so as not to allow it to establish itself in a decisive manner.

If measles is the occasion of the development of some cutaneous affections, it is thus in return, in many cases, the cause of their disappearance. Thus it is related that several children labouring under chronic diseases of the skin have been cured of them by this disease. One does not always agree on the nature of the influence exercised by the affection of measles in this case. Is it salutary, or is it noxious? a question which it is impossible to decide.

M. Rayer believes that this influence is salutary, and he founds his belief on the fact of a young girl whom he attended and whom he saw cured of a chronic eczema of the scalp, face, and ears, in consequence of the disease we are now discussing. On the other hand we might look

upon this influence as a very fatal one if we formed our opinion of it from the two cases reported by Alibert, and in which death rapidly came on in two children cured of impetigo of the scalp by an attack of measles. As is seen, the question is not sufficiently elucidated by experience, and it is necessary to wait for fresh facts before we can form an opinion on this point.

The thoracic symptoms which are developed so frequently as the consequence of measles give evidence of its *distant* influence on the constitution of children. In fact, how many times has not one observed after this disease, pulmonary tubercles become developed in subjects who did not appear to be predisposed to them! How many times, also, has not one seen under this influence the tubercular affection, latent in children, assume a fresh impetus and progress with an unexpected rapidity? For, in fact, measles exercises a true influence over the development of pulmonary tubercles, and very much accelerates the progress of this disease in the children who are attacked by it.

APHORISMS.

306. Fever accompanied by redness of the eyes, lachrymation, and sternutation, is a precursory symptom of measles.

307. Measles commencing by a convulsion is always unfavourable.

308. Measles without catarrh always terminates favourably.

309. Measles accompanied by catarrh is often complicated with pneumonia.

310. The pneumonia of measles, which is described under the term of *morbillous pneumonia*, possesses a specific nature, which modifies its appearance and which renders it very fatal.

311. The pneumonia of measles is most frequently fatal.

312. The pneumonia of measles engenders, more than any other variety, the miliary granulations of phthisis.

313. Anomalous measles are always serious by reason of their sudden and unexpected complications.

BOOK XVI.

ON INTERMITTENT FEVER.

Intermittent fever is a general disease, characterized by intermittent febrile attacks, the cause of which is to be traced to miasmatous impoisonment.

The history of the intermittent fever of children at the breast has been neglected by all the physicians who have written on the diseases of infancy. This is to be regretted, for there are few diseases of the first stage of infancy which present so great an interest.

I am the first who has given the description of it, and since then I have with pleasure seen my observations confirmed by MM. Ebrard, Schulzer, Guiet, Alaboissette, Pitre-Aubanais, &c., in different memoirs which had been published in the journals.

It is very important to recognize the intermittent fever of young children; first, because it is rather frequent, rather serious, and notwithstanding this, however, easy to cure; and secondly, because it furnishes us with a curious example of the modification which age may impress on diseases. In fact, the intermittent fever of children at the breast, which has the same apparent origin and the same appreciable nature as the intermittent fever of older children and adults, differs from it remarkably in its symptoms. It is not at all accompanied by the rigors characteristic of ordinary intermittent fever, and it is never very regular in its paroxysms. This latter circumstance has singularly contributed to throw obscurity over its diagnosis.

Causes.

Intermittent fever is observed, it is said, in the fœtus *while yet in its mother's womb*. Thus, M. Pitre-Aubanais, states that he has seen two children born of mothers who had had intermittent fever in their pregnancy, and who had considerable hypertrophy of the spleen. Both presented intermittent fever of the tertian type, the fits of which returned at the same hours and at the same days on which the febrile accession was observed in their mother.

M. Jacquemier quotes from Schuriz the case of a woman, pregnant for the third time, who was attacked in the second month of her pregnancy by a very obstinate quartan ague. In the last month of gestation, before or after the paroxysm of her fever, she felt the fœtus move, tremble, and manifestly roll from one side to the other, Then, after a strong paroxysm, she was delivered of a daughter,

who, at the same hour as the mother, was seized with an attack of very intense fever, which continued for seven weeks.

I shall not discuss these instances too extraordinary for implicit belief, I neither accept them nor throw them aside, and I simply appeal to ulterior observations which will decide the amount of truth or of imagination they possess.

Intermittent fever is observed in children of all ages; it is developed in conditions absolutely similar to those which preside over the development of the intermittent fever of adults. At Paris it is met with in children at the breast, living in a malarious, damp, and imperfectly lighted dwelling, in those whose nourishment is imperfect. It is, then, a disease of the poorer classes. It is observed in children inhabiting *marshy districts*, or in those who have been sent to nurse in these countries. Thus it is very common in the departments of Orleanais and Berri, provinces which furnish a great number of the nurses of Paris.

I have had the opportunity of observing fifteen cases; four at the Necker Hospital, in the practice of M. Trousseau, and eleven in the city. The greatest caution was necessary in order to arrive at a precise diagnosis.

Symptoms.

Young children attacked with intermittent fever are diminutive, thin, and slightly developed for their age. One of those who fell under my notice was twenty-eight months, and one would hardly have thought it more than six months old. The flesh is soft, the skin is flabby, of a yellowish white, the gums colourless, the belly very large, and the left hypochondrium covers a moveable tumour, rather large, sometimes apparent, and which is formed by the *hypertrophied spleen*. It is useless to employ percussion in order to define the limits of this organ, for with the state of the emaciation of the children and the slight thickness of the anterior abdominal wall, the spleen forms a projection, and is very decidedly marked beneath the skin. It is observed to change its position at each movement of the child; it may be pushed back and made to disappear at will, by means of pressure of the fingers. It is, then, impossible to mistake this increase of size, and here the eye may advantageously take the place of percussion. This is so far true, that the hypertrophied spleen may be circumscribed, and the position which it occupies beneath the skin, marked with a stick of nitrate of silver.

Intermittent fever throws the young children into a state of great cachexia; their limbs become infiltrated with serum, and cutaneous hæmorrhages take place in the skin, true petechiæ, sufficiently large

to come under the denomination of *purpura hæmorrhagica*. The first patient who came under my observation presented these two phenomena of infiltration and of hæmorrhage.

It is possible that one day the complement of these morbid states may be met with in patients; that is to say the general serous effusion, together with œdema of the limbs, or the hæmorrhages of the mucous membrane with hæmorrhages of the skin.

I have not been able to discover in the heart and in the vessels the *bruits* characteristic of anæmia, but it may be conceived that they escaped me. In fact, auscultation of the heart is rather difficult in young children, so that those *bruits* may have escaped my ear. The examination of the heart agitates the little patient so violently, that it is impossible to derive any advantage from it.

Such are the general symptoms which children at the breast present when attacked with intermittent fever. The symptoms of febrile reaction are also well characterised. The fever returns by more or less violent fits, always very irregular, the health appearing to be pretty good in the interval, except in a certain number of special complications.

Return and Duration of Fits.

The attacks of fever are very irregular in children at the breast; they usually present the quotidian, seldom the tertian type, and they return at hours which are not constantly the same. In the city I once observed the tertian type; but the subject had already attained his second year, and should therefore perhaps be included in the category of children of the second age. A much larger number of cases are necessary in order to establish in an incontestable manner that, in children at the breast, intermittent fever presents the quotidian type.

However this may be, the fits are observed every day; they appear at different hours. They present three stages, but one alone is well characterized. The rigors, as far as we could make out, were generally wanting; they are replaced by a sort of concentration of the strength which does not escape the enlightened medical man. The heat which succeeds is very intense; it is the symptom which strikes mothers, and which they point out to the medical man. The sweating then manifests itself, but it is not very abundant.

When the attack of fever commences, the pulse becomes small, disappears beneath the fingers, and is deficient to such an extent that it is difficult to specify its presence; the face becomes pale, the nose pinched, the lips colourless, the skin contracted, and the nails of a bluish tint. The hands are cold, but the temperature of the breath does not appear to be modified. If the sensation of cold exists, which

it is impossible to doubt, it does not betray itself outwardly by a general trembling. It is in this that the intermittent fever of young children differs from the intermittent fevers of the second age, and it is this which renders the diagnosis of the disease difficult. This anomaly ceases in the course of the third year; for I have observed intermittent rigors in a subject two years and a half old.

I have not seen sufficient children in the course of the stage of the concentration of the strength to determine its duration. It would even be impossible for me to give an opinion on this subject, for the information afforded me by the mothers is insufficient. Most of them had paid no attention to the phenomena which indicate the commencement of the febrile attack or were incapable of giving an account of it.

At this stage the phenomena of calorification succeed, which might be very readily taken for the commencement of fever, if it be not observed with great attention. The children become flushed and burning; the skin is dry, the pulse rises and acquires a force which it did not possess in the preceding stage, in which it was difficult to appreciate. It rises to 120 and 130 pulsations. At the end of an hour or an hour and a half the heat diminishes and sweating commences; it is not very plentiful; it is rather a moisture than a true secretion of perspiration.

These two last stages together are generally the only ones of which mention is made to the physician. The mothers state: at such an hour yesterday my child became feverish and it afterwards had slight perspiration; these symptoms lasted about two hours, then all disappeared. We should then carefully inquire into the succession of the phenomena, and direct attention to, or ourselves observe, the stage which precedes the appearance of the heat.

The urine of children at the breast, attacked with intermittent fever, does not present any very appreciable modifications; although it may be difficult to collect it, we may judge of its state by the reddish colouring of the linen, in the case in which it would contain the red sediment of febrile urine.

[M. Heimbrod (*Med. Zeitung.;* 1851; No. 43), while he cannot on the one hand agree with Neumann, that one half of the cases of convulsion that occur in children under three years of age are due to intermittent fever, yet believes on the other, that the opinion expressed by several physicians, that young children are not liable to the disease, is the result of superficial observation. During the severe prevalence of the fever in Oberschleisen, in the year prior to the outbreak of the cholera, he met with twenty-five cases, occurring in children from five months to two years of age. In all these there was a distinct preliminary stage, exhibited by loss of appetite, indigestion, sleeplessness, quick pulse, &c. In fifteen of the number, the conditions of shivering, heat, and sweating, were as distinctly separated from each other as in the adult.

The paroxysm commenced with pallor of the face, a remarkable blueness of

the lips, and diminished temperature of the surface, the pulse becoming small, and the child apathetic. In from a quarter to half an hour restlessness came on, accompanied by redness of the surface and excessive thirst, the pulse being full and the urine high coloured. Vomiting occurred; and in plethoric children the symptoms sometimes resembled those of meningitis. This stage continued in a greater or less degree for one or two hours, when the burning heat ceased, the child became sleepy, and the pulse soft; and a profuse sweat broke out, which continued for a variable period, during which the child usually slept. Even in infants this sweat was sometimes so profuse as to soak through all their linen. At the end the child would wake up, drink, and continue free from ailment until the next paroxysm set in.

Cases like the above are easy of diagnosis; but the greatest care is required in distinguishing those which are termed *vagæ* or *erraticæ*, and the type of which observes no regular rhythm. Seldom as such a variety is met with in the adult, its occurrence is frequent in the child; and M. Heimbrod has observed it with exactitude in ten out of his twenty-five cases. After a longer or shorter period of uneasiness, a severe paroxysm comes on, usually in the *morning*. The cold stage, as a rule, is either absent or so slight as to be overlooked; but the hot one is more severe and of longer duration, and is followed by a slight degree of, or even by no sweating. The pulse retains its frequency for the whole day, the child remaining restless, excitable, thirsty, and sleepless. In the *evening* the careful observer will perceive signs of a remission, although these may be very slight, and may also be present at the same time on the ensuing morning, as the paroxysm occurs on the other day. No complete intermission occurs, and the case may be easily mistaken for one of *remittent* instead of *intermittent* fever—especially as gastric complications are common. The prevalence of intermittents among adults, and the occurrence of the paroxysm in the forenoon and of the remission in the evening, are the most important aids for enabling us to decide.—P.H.B.]

Diagnosis.

The symptoms just described ought to be sufficient, I think, to ensure the diagnosis of the intermittent fever of the children at the breast. When in one of these little patients we observe a general decoloration, with emaciation of the entire body, and when there is every day a fit of decided fever, according to the account of the parents, suspicion should be directed to the disease we are now considering. We then find daily irregular fits, similar to those above described, combined with *decided hypertrophy of the spleen*, and often more or less marked œdema of the limbs. If no other change in the organism exists, we may, without fear of being deceived, conclude in the existence of intermittent fever.

These symptoms present great analogy with those which are observed in the chronic diseases of children. Thus in tubercular pneumonia, chronic entero-colitis, &c., we also observe quotidian fits of fever, either single or repeated twice a day.

These fits are easily distinguished from the fits of intermittent miasmatous fever. They do not present at the commencement the concentration of the strength, and there is no enlargement of the spleen.

Besides, other symptoms are discovered which reveal the deeply-seated alteration of the organs and indicate the cause of this symptomatic fever.

Complications.

Anæmia is the most serious complication of the intermittent fever of children at the breast. It is characterized by excessive pallor of the integuments, serous effusion in the limbs, and probably by a modification of the sounds of the heart which we have not been able to detect.

Purpura hæmorrhagica observed in one of our children ought to be considered as a complication of intermittent fever. It depends on the alteration of the blood caused by this disease.

Diarrhœa is met with rather frequently in the course of the disease we are now considering. It is a phenomenon which depends on the general state of weakness, or even cachexia caused by the action of miasmatous emanations on the individual. The diarrhœa is often transient and purely nervous; in other patients it is the result of well characterized entero-colitis.

Such are the usual complications of intermittent fever. I shall not enumerate lobular pneumonia, which caused the death one of our patients in the course of this fever, for no relation can be established between these two diseases which are entirely independent of each other.

Prognosis.

Intermittent fever is not of itself a serious disease in young children, but it is of sufficient importance in this sense that it very much interferes with the growth of the body and with the accomplishment of the nutritive functions. Moreover, when it is prolonged, it necessarily leads to a state of cachexia which may place the children in great danger. However, not one of those who fell under my observation died in consequence of the disease. One of them died from intercurrent pneumonia. Another, three months after its recovery, was seized with pleurisy which terminated in death. Consequently, of fifteen patients, one only died in the course of the disease, and that one from a different affection. All the others perfectly recovered. This is the usual termination of intermittent fever when it has not been too long established.

[Of fifteen males and thirteen females who died in London, in 1849, from ague, five males and three females were under five years of age.—P.H.B.]

Treatment.

In this disease antiperiodics, general tonics, and alteratives, should be administered. The combined use of these remedies has always succeeded

with me. In the morning a spoonful of the antiscorbutic syrup should be given, the subcarbonate of iron in the middle of the day, and *quinine brute* towards the evening or after the end of the fit.

[The quinine *brute* or impure quinine is said to be much more active than the sulphate of quinine, it is insoluble in the saliva, and has not much taste—100 parts of it contains sixty-five of pure quinine, thirty of cinchonine, and only five of water; while in 100 parts of sulphate of quinine there are thirty of water. This preparation is soluble in lactic acid, and is quickly changed into soluble salts in the stomach by the acids which exist in that viscus. Its resinous consistence is another advantage, since it admits of being rolled into pills, in which form it may be mixed with sago, or given in any vehicle which contains no acid, since they would at once convert it into bitter and insoluble salts.—P.H.B.]

This last mentioned medicine, which I saw administered for the first time by M. Trousseau, forms the basis of the treatment of the intermittent fevers of infancy. It possesses the advantage over the sulphate of quinine of being less soluble and less bitter, and consequently it may be swallowed without repugnance by the little patients.

The *quinine brute*, which must not be confounded with *pure* quinine, presents the appearance of a greyish resinous mass, easily softened in the fingers and cut in small grains by means of a knife. It should thus be reduced into granules, and administered to the children, immediately after the fit of fever, in the dose of from three to six grains a day. This quinine powder should be mixed with a spoonful of gruel or of jam. The same dose of the medicine should be given every day until the febrile phenomena cease and until the disappearance of the volume of the spleen is effected.

The *quinine brute* completely supplies the place of the sulphate of quinine in its antiperiodic febrifuge properties. Its influence on the diminution of the spleen is very nearly similar to that of this other medicine. In this case the spleen gradually diminishes in size, but the diminution is only complete when the febrile attacks have disappeared. It would not be correct to state that the diminution of the organ takes place in some minutes. In young emaciated children it is observed to form a projection beneath the skin, its outline may be traced with a pen, and when the *quinine brute* is administered it may be examined for a length of time before any change is observed in its dimensions. Nevertheless, I repeat, if this diminution is not instantaneous, which is true, it is not the less one of the constant physiological phenomena of the administration of quinine; only its action is not produced until after several days, and then very slowly.

In absence of the *quinine brute*, the sulphate of quinine may be employed as an enema in the daily dose of from one and a half to three grains, dissolved in a few drops of vinegar and $\bar{z}$ iss of decoction of marshmallow, or, as a suppository, with the same dose of the salt mixed up with butter of cacao.

The sulphate of quinine has been employed in frictions, three times a day, in the dose of forty-five grains to ℥j of lard; or internally, prepared in the following manner:

Sulphate of quinine	2 to 3 grains.
Coffee	℥ iij.
Sugared milk	℥ vj.

It is not an easy matter to make use of these remedies in children, and for my part I prefer the *quinine brute* or enemata of the sulphate of quinine.

Whilst the quinine is administered with the intention of warding off the attacks of fever, the cachexia and the debility of the patients may at the same time be treated by the preparations of steel. These preparations ought to be continued after the cure of the fever until the yellow tint of the skin is replaced by a more healthy looking carnation. The subcarbonate of iron should be administered in the dose of from three or five grains. Under the influence of this remedy the appetite increases, the strength returns, the œdema of the limbs disappears, and the red colour of the cheeks indicates the return to health.

The action of the steel may be assisted by several adjuvants, such as the syrup of bark or the syrup of orange peel; but these medicines are not absolutely necessary. It has been proposed to treat the serous effusion of the limbs by diuretics, and especially by the nitrate of potash. This precept is rather the result of a theoretical view than of a precise knowledge of the course of the œdema. In fact, as this symptom is the consequence of the anæmia, it is this general disposition of the economy which must be treated by tonics and by the ferruginous preparations, and the œdema itself need not be attended to. In this case, therefore, it is useless to employ diuretics.

To resume, then: the intermittent fever of young children differs much from that of adults.

The attacks are quotidian, and come on at indeterminate hours. They only possess two very evident stages—the hot stage and that of perspiration.

The stage of rigors or of trembling is entirely wanting; it is replaced by a sort of concentration of the strength, indicated by the general and momentary decoloration of all the tissues.

This disease determines the enlargement of the spleen, and renders this organ apparent through the anterior abdominal wall.

Intermittent fever may nearly always be cured; it is the cause of very decided cachexia, with œdema of the limbs and cutaneous hæmorrhages.

Bark very easily cures it. In children the *quinine brute* is the most useful remedy to prescribe.

Remittent Fever.

[Fever possessing a more or less remittent form; often accompanied by gastro-intestinal irritation and inflammation, the febrile paroxysm usually coming on towards evening, the remission in the morning.

Much obscurity and confusion have attended the descriptions of this disease, under the various titles of worm fever, infantile hectic fever, &c.; some have supposed it to be a symptomatic fever, excited by gastric and intestinal disorder, and confined to the period of early life; while the absence of the well-marked rigor which usually attends the commencement of fever in the adult, the rarity of any cutaneous eruption, and the comparatively low rate of mortality resulting from it, have led authors to deny the connection between it and the continued fever of the adult.

Locock has chiefly met with it among the children of the affluent, as depending on over-feeding and other direct exciting causes of irritation of the mucous membrane, and "*never* proceeding from the state of the atmosphere, and *never contagious*." Butter, who describes it, and the results of his experience from an epidemic in Derbyshire, says, "the acute form is epidemic and also contagious." West and Willshire describe it as seen at the Infirmary for Children, in the neighbourhood of which epidemic and endemic causes are rife, and adopt the opinion of Rilliet and Barthez that it is identical with continued fever. "Both diseases occur independently of any unvarying cause, often independently of any cause which we are able to detect; and both, though generally affecting isolated individuals, yet have also their seasons of epidemic prevalence. Though varying in severity, so that in some cases confinement to bed for a few days is scarcely necessary, while in other cases the patient hardly escapes with his life, yet medicine has not been able to cut short the course even of their mildest forms. And, lastly, though the local affections associated with both vary much in different cases, yet in every instance we meet with that assemblage of symptoms which make up our idea of fever; or if, from the examination of the symptoms during life, we pass to the inquiry into the traces left by the disease on the bodies of those to whom it proves fatal, we shall find still further evidence of the close relation that subsists between the fever of the child and that of the adult. Enlargement, tumefaction, and ulceration of Peyer's glands, constitute one of the most frequent morbid appearances in both diseases, and in both, the changes that these glands are found to have undergone are more advanced and more extensive in proportion to their nearness to the ilio-cœcal valve. In both, too, the mesenteric glands are enlarged, swollen, of a more or less deep red colour, and manifestly increased in vascularity; while the softened state of the spleen, the gorged condition of the lungs, and the congestion of the membranes of the brain, are appearances common to both diseases. There is, however, no more relation between the severity of the intestinal lesion and the intensity of the symptoms in the fever of the child than in that of the adult; and there is no ground for regarding the disease as the mere effect of the constitution sympathizing with a certain local mischief in the former case, which may not be equally alleged with reference to the latter. The symptoms in both are the expression of the influence of the disease on the whole economy, of the disorder which it occasions in the principal functions of the body, and are an essential part of the disease itself, rather than the secondary effects of certain lesions of the bowels.—Chomel, *Leçons de Clinique Médicale;* p. 231; 1834.—West on *Diseases of Childhood;* 454.

Dr. Meissner met with one decided case of typhus in a child at the breast, within fourteen days after birth. Its history is given in detail along with two

problematical typhus cases. All the three mothers of the children died of "metritis puerperalis." Amongst its predisposing causes may be reckoned, damp and cold weather, easterly winds, insufficient food, or food of a bad quality, residence in an unhealthy locality, and, according to Locock, a single large meal of indigestible food may be a cause of the acute form of remittent fever.

Authors appear to differ as to the period of life at which it is most frequent; Coley states from the sixth month, others during dentition, Locock from two to six years, and Rilliet and Barthez that remittent (typhoid) fever occurs most frequently from nine to fourteen years of age, is less frequent from five to eight, and very unusual in the earlier years of childhood.

It is more frequently observed in autumn than in the spring, and the localities in which it is most prevalent are those where the drainage is bad and open ditches abound.

Taylor *(On Infantile Remittent Fever)* gives five forms of remittent fever—1st, mild or simple form; 2nd, acute form; 3rd, chronic form; 4th, typhoid form; 5th, apyrexial or malarial disease.

1st. Simple or mild form. The disease comes on gradually, after a few days' indisposition, and loss of cheerfulness, the countenance puts on a dull, heavy appearance, the appetite is lost, the patient is restless, thirsty, and frequently picking the nose and lips; if seen in the morning the skin may be hot, but frequently is not so, towards the evening he becomes feverish and drowsy; the cheeks flushed, the pulse, which in the day was almost natural in frequency and character, is quickened, varying from 100 to 120, and if delirium is present rising even to 140 in the minute, and somewhat sharp and incompressible; the sleep is disturbed and restless, with occasional rambling and incoherent talking, the patient waking unrefreshed in the morning. This paroxysm lasts but for a few hours, passing off gradually; and towards morning the child falls into a more quiet and composed sleep; sometimes a slight perspiration breaks out, and as the day advances the child appears merely indisposed, being in the same condition as the day before. In some instances two distinct exacerbations and remissions of the symptoms may be observed in the course of every twenty-four hours, but in the majority of cases one only is well marked. The tongue is generally rather deficient in moisture, red at the tip and edges, thinly coated on the dorsum with white fur, through which the papillæ appear of a deep red colour; the amount of fur on the tongue appears to be in proportion to the gastric disturbance. The bowels are confined, but seldom much out of order; they are sometimes loose even at the onset of the disease, or if not they are in general readily disturbed by medicine, a very mild aperient being frequently followed by three or four unhealthy evacuations for the next two or three days. The feverish condition returns as the day declines, but some cases decidedly remittent lose the remission and assume the continued type. The symptoms gradually improve and the patient becomes convalescent, but considerably weakened by the attack.

2nd. The acute form. This form may arise suddenly after a large meal of indigestible food, according to Locock, and may be regarded as a symptomatic or irritative fever, or it may supervene after a continuance of improper diets.

The onset may either commence as in the simple form, gradually developing itself into greater severity, or may set in with all the characters of an acute affection, as headache, great disturbance of the sensorium, vomiting; if old enough, the child complains of his head, of pains in the limbs, and that he is not well; the face is flushed when the onset is acute, otherwise dull and stupid; a dark areola is observed around the eyes, which are heavy; occasionally the drowsiness is so overwhelming at the onset of the disease that West has known a child fall asleep three

or four times during breakfast, accompanied by dizziness and inability to walk steadily; the tongue is loaded with a thick, whitish, and occasionally yellowish fur, even to the apex; the papillæ elongated and often highly injected, having a somewhat "strawberry appearance;" sometimes it is brown and rather dry, breath offensive, appetite capricious, at times the child not eating anything, at others heartily during the remission; there is frequently irritability of the stomach and vomiting, attended with pain at the epigastrium; and as the sickness is usually more severe in cases in which constipation is present, there is some risk of mistaking the real nature of the affection, and of regarding the irritability of the stomach as a sign of approaching cerebral disease. The abdomen is soft, and pressure unattended with pain. The bowels may be relaxed or costive, the latter more frequent at the commencement, the former at a later stage. When confined the stools are of a clayish or earthy appearance, deficient in bile, or of a mixed nature, some portion clayey and others of a more yellow hue, sometimes almost black and scybalous. When relaxed they are very offensive, of a pale clay appearance, sometimes frothy, worms are occasionally observed in them; the urine is scanty and deposits lithates on cooling; the temperature of the body increases as evening approaches, and West has in a few instances found it ranging as high as 105° Fah. Towards evening the symptoms become increased; sometimes a rigor is observed, but this is not usually the case; the pulse ranges from 140 to 160, and there is by no means a constant relation between the heat of the skin and the rapidity of the pulse. The face becomes flushed, thirst is complained of, and the tongue is dry and parched; drowsiness is remarked, and the sleep disturbed by rambling and delirium; now and then, but not generally, the delirium is of a noisy kind, and the child not unfrequently tries to get out of bed; and both the restlessness and the delirium, though generally present in bad cases during the day time, are aggravated in a marked degree at night. West has once or twice known violent delirium come on towards evening, the child crying and shouting aloud during nearly the whole night, and sinking into a state of stupor by day; the respiration is hurried, occasionally interrupted by a short hacking cough; after some hours the fever abates, perspiration, either profuse or partial, is observed, and towards morning all the symptoms decline; this form, when arising from over feeding, and treated accordingly, may not continue beyond a single day; but when it is the consequence of other causes its duration is from ten days to a fortnight; as the case advances towards recovery the morning attack disappears long before the evening paroxysm ceases to recur, and it not unfrequently happens that a slight threatening of the evening exacerbation continues to return for some time after the child has seemed in other respects well.

3rd. Chronic form. The symptoms are less defined than in the acute form, the face less flushed, but more sallow with a dark areola round the eyes, the skin is but slightly increased in temperature, and during the remission often cool and flabby; the paroxysm of fever is less marked and is often absent or apparently so for a day or two and then reappears, the increase of heat being only observed in the hands and cheeks; bowels irregular, tongue foul, and papillæ injected; the appetite is fanciful and nausea is frequently present; the pulse, always above the healthy standard, is quick and irritable; picking of the nose until it bleeds, or of the tips of the fingers until they are quite sore, is often observed, and various eruptions of ecthyma and porrigo. In this form the duration of the disease is prolonged and recovery takes place slowly, and in scrofulous children frequently induces mesenteric disease, and when occurring after measles, scarlatina, hooping cough, or other diseases where there has been inflammation of the intestinal mucous membrane, is peculiarly subject to a relapse, and is often accompanied by scrofulous skin diseases

and aphthæ, and in very bad cases by ulceration and even gangrene of the mouth ; in a case which came under my notice, necrosis and separation of a portion of the lower jaw were observed.

4th. Typhoid form. As in the continued fever of adults, so in the febrile affections of children, a low or typhoid form may supervene on an acute attack, or it may assume this character from the commencement ; the patient becomes gradually weaker, and throughout the day a drowsy condition approaching to stupor ensues, from which it is difficult to arouse the child, the tongue becoming dry, brown, and glazed, and often if diarrhœa is present, or other indication of enteric mischief, it is red and shining, the lips and teeth are covered with sordes, the pulse quick and feeble, sometimes small and thready. Low muttering delirium and pricking of the nose and lips are observed. Diarrhœa is usually present, though not in general severe, the evacuations have a yellow ochry colour ; there is sometimes pain on pressure on the abdomen, more particularly towards the right iliac region. The child seems nearly or quite unconscious of what is passing around him ; the evacuations are passed involuntarily, the sensation of thirst, so distressing in the early stages of the disease, seems abolished. The patient sometimes refuses all food, at others takes it freely ; petechiæ occur, and in some cases bullæ are observed ; an eruption has been described by Rilliet and Barthez, who observe that it very seldom appears so early as the fourth day, from the sixth to the tenth being the most common date of its appearance ; while both the period during which it remains visible and the number of spots, are liable to very great variation. In by far the greater number of cases, the eruption, according to their experience, is extremely scanty ; it often remains visible for only two or three days, and in not a few instances is absent altogether. Taylor has met with maculæ, but only very rarely. The duration of this form is two or three weeks, terminating most frequently in recovery, the symptoms gradually improving, the bowels acting regularly, the evacuations becoming more natural, the tongue clean and moist, the thirst diminished, and the evening exacerbation of fever shorter and less severe ; the convalescence is always slow, and relapses occur from very slight causes.

5th. The malarial disease, according to Taylor, possesses many of the symptoms of the mild form without the paroxysm of fever ; it appears to resemble the intermittent fever of children of which Bouchut has given so good a description.

The prognosis of remittent fever is generally favourable, death is rarely the result of this disease ; when this is the case, it is more the consequence of the complications than of the disease itself. "Now and then a fatal termination takes place after the lapse of little more than a week from the commencement of the illness, under signs of cerebral disturbance which throw the general febrile symptoms into the shade ; great restlessness and agitation, with loud cries being succeeded by convulsions, and they in their turn, being followed by a condition of coma, in which the child dies ; while an examination after death discovers nothing more serious than a somewhat greater vascularity than natural of the brain and its membranes." West, *Op. Cit.;* p. 459.

The diagnosis of remittent fever has been rendered difficult by reason of the indefinite manner in which this term has been applied to various disorders ; rheumatic fever, lung affection, bowel affection, and mesenteric disease, are liable to be confounded with it. "General tubercular disease, running an acute course, may now and then for a short time be taken for remittent fever, but the observation of the case for a few days will usually suffice to correct the error. In most instances of the former affection, indeed, the possibility of mistake is altogether prevented by the skin being less hot, the sensorium not disturbed, and the abdominal symptoms

less severe than they might be expected to be in a case of remittent fever of the same degree of severity. Independently of this, too, auscultation will often show good reason for suspecting the real nature of the case, or the previous history of the child will afford some clue with reference to it."—(West, *Op. Cit.*) By a too energetic treatment in chronic remittent fever, the hydrocephaloid disease may be brought on; hydrocephalus itself, often closely resembles remittent fever. The following table by Mr. Taylor will serve to distinguish between them:

Remittent Fever.	Hydrocephalus.
Head, slight pain in.	Head, violent pain in, tossing of; backwards, and bored in pillow.
Delirium at night frequent; convulsion rare, sometimes at onset.	Delirium seldom; convulsion not early, more towards end of disease; aversion to light and noise.
Easily aroused.	Roused with difficulty; stertorous breathing; squinting; paralysis in late stage.
Hands usually thrown about bed.	Hands tossed about head.
Countenance heavy and dull; vacant expression, as of fever in adult.	Countenance sometimes anxious, sometimes dull.
"Neither knitting of brows, nor pupil of eye affected."	Knitting of brows; wakefulness; pupil of eye contracted in early stage, sometimes oscillatory, afterwards dilated.
Senses of sight and hearing often dull.	Senses of sight and hearing often acute in early stage.
Pulse quick throughout the disease.	Pulse quick, but irregular in its action, and forced in early stage; often beating of carotids, and pulsation and prominence of fontanelle; pulse afterwards becomes slow, but, on raising the child, again quickened.
Bowels occasionally constipated at first; frequently relaxed.	Bowels constipated, and very difficult to move.
Motions various; often clayey and deficient in bile; very offensive.	Motions peculiar and characteristic, dark green and slimy, like chopped spinach.
Vomiting occasionally at first, but never continuous.	Vomiting early in first stage, often very constant, especially on assuming the erect posture, or sitting up.
Pain often in iliac regions, particularly the right.	Pain occasionally at hypochondrium.
Abdomen in advanced stage sometimes tumid.	Abdomen drawn in advanced stage.
Appetite mostly destroyed; will not take anything.	Appetite sometimes good; will take food.
Thirst often great from commencement.	Thirst not great in first stage; often in latter stage great avidity for constant drink.
Tongue often loaded with yellowish-white fur, in gastric form, and elongated and injected papillæ, giving it a "strawberry appearance;" red, dry, and occasionally brown, in malarial form.	Tongue white; nothing indicative.

Remittent Fever.	Hydrocephalus.
Skin, very great heat of, sometimes equal to exanthemata or pneumonia; abdomen generally hotter than head; picking of skin, especially of nostrils, corners of eyes, and mouth.	Skin, increased heat of, but not great; less than in remittent fever; afterwards becomes cold; head the hottest part.
Paroxysms pretty regular; exacerbations towards night, remissions in morning.	Varies in intensity, but without any regularity.
Age: seldom occurs under three years, more frequent after fifth year; not influenced by sex or constitution.	Age: frequent under third year; seldom after fifth year; more frequent in boys and in scrofulous constitution; hereditary.

Hydrocephalus is, however, liable to arise in the course of remittent fever, which it does almost imperceptibly.

Dr. Schoepf Merci makes the following remark on the fever of children: "In almost all the fevers of children, headache and gastric disturbance are present, constituting often very prominent phenomena, and very frequently leading to an erroneous treatment, as their import is mistaken. Febrile headache, an obvious but often little cared for symptom in the adult, almost always gives rise to serious apprehension in the minds of the parents of a sick child; and the medical attendant, frequently considering it as indicative of the commencement of meningitis, becomes prodigal of leeches and mercury. It may happen that diaphoresis follows, and that a case of meningitis is said to have been cured. But the result of such therapeutic interference is not always so favourable, for the organism of a delicate child very frequently becomes unable, from the effects of depletion, to pass through a natural crisis. No less an amount of mischief often follows, also, what may be termed the antigastric treatment. Both errors in practice are not uncommon, since slight soporosity, convulsions, or vomiting, are not unfrequently the *prodromi* of the acute fever of children. On the other hand, it must be confessed, the above-mentioned and other local affections sometimes complicate the course of the febrile disorder. It becomes, therefore, a matter of the highest importance to study the physical signs of this malady in children."

The treatment of remittent fever in children, like that of continued fever in the adult, should be chiefly expectant, medicine appearing to have no effect in cutting short even the mildest forms.

Rest in bed, cool drinks, sponging the surface of the body with lukewarm water, mild aperients if necessary are obviously indicated. In diarrhœa, with unhealthy evacuations, the combination of hydr. c. cretâ and Dover's powder is most effectual; if there is much pain over the right iliac region a warm poultice may be applied, and in the event of the pain not being removed, a few leeches should be put on. Cold should be applied to the head when delirium is present, and when considerable determination of blood to the head is manifest, attended by great restlessness and noisy delirium, depletion by leeches to the head may be practised. The vital powers should be supported by nutritious alimentation, and stimulants are necessary during the second and third weeks of the affection. West speaks highly of a mixture consisting of four minims of dilute hydrochloric acid, eight of compound spirit of sulphuric ether, and three drachms of camphor mixture every six hours for a child of five years old. The various complications should be treated in the manner directed in the various chapters on these subjects.

The convalescence is frequently exceedingly tedious, and in these cases change to sea air is most likely to prove beneficial.—P.H.B.]

BOOK XVII.

ON DISEASES OF THE SKIN.

The greater number of diseases of the skin are developed in children as well as in adults, and most of them present, at different ages, precisely similar anatomical characters. With respect to these, it is, consequently, useless to give a description of them which will be readily found in special treatises on cutaneous diseases. There are a certain number, on the contrary, which are only observed in children, or which, in the tender age, present differences which it is important to mention. These are *gourmes*, *redness and fissures of the buttocks and thighs*, *simple pemphigus*, *erysipelas of infants*, *induration of the skin*, *&c.*

CHAPTER I.

ON ERYTHEMA AND ULCERATION OF THE BUTTOCKS AND MALLEOLI.

A slight cutaneous affection is often met with in young children; it was formerly termed *intertrigo*, that is to say, erosion, which sometimes becomes the origin of rather severe symptoms, and which is always the cause of acute pain. This disease is characterized by simple erythema of the buttocks, genital organs, internal parts of the thighs, heels, or malleoli, an erythema followed by erosion and ulceration of these parts.

This disease is met with in children whose constitution is feeble and who have frequently diarrhœa, in those who have derangement of the digestive functions, and in those who, without the influence of these circumstances, are badly cared for and imperfectly attended to.

Erythema of the thighs is the result of the irritation of the skin by the urine and excremental matters; the intensity which it may acquire may be readily imagined when it is considered that the evacuations are very numerous in diarrhœa, that the children are constantly moistened and that they sometimes remain much too long in the excrement, that the changes of linen are not sufficiently frequent, especially in the children of the poorer classes, and finally, that in this last-mentioned case, the linen of which the napkins are formed

is sometimes much too rough for the highly delicate skin of little children.

Erythema of the malleoli and of the heels also depends on the irritation of the skin produced by the excremental matters, but it is more especially the result of the friction of these parts against each other or against the clothes. Thus, when care is not taken to isolate the limbs of the little child by means of the first layer of linen which surrounds them, the internal malleoli are incessantly rubbed together in the to and fro movements of the heels on the cloth. The result is, these parts become red, and lastly ulcerate to a greater or less extent.

Erythema has been considered as a very unfavourable general symptom, and precursory of certain diseases of young children; thus M. Valleix* is of opinion that it always precedes an attack of thrush. This may be; but it must be at the same time confessed that the children are at the time labouring under diarrhœa of one or more days' duration, a circumstance which it is absolutely necessary to bear in mind for the reasons we have but just mentioned.

Erythema is certainly in relation with the state of the constitution in children; it preferably develops itself in subjects who are weak and of bad constitution. But this circumstance would be of little value if there was not at the same time derangement of the alimentary canal characterized by a commencement of diarrhœa. The disease appears very rapidly in children of bad constitution. It requires a much longer time to develop itself in those who are strong and robust and who have only fallen ill accidentally.

It is observed in the course of all diseases of infants at the breast, when there is an increase in the number of stools and when the children's linen is not changed sufficiently often. It is a disease which is especially in relation with diseases of the alimentary canal. It constitutes the most constant complication of thrush and of entero-colitis.

Erythema of the buttocks and the thighs is, in the first instance, characterized by a simple redness of the integuments. The redness extends to the genital organs, and down the entire length of the limbs to the heels. Small reddish papulæ, more or less confluent, quickly form, and each of these becomes the seat of an erosion of the epidermis. Thence results a great number of superficial ulcerations of the skin, the base of which, red, raw, and bleeding, is observed on a level with the circumference. These ulcerations extend in size and in depth; they coalesce with the adjoining ulcerations and sometimes acquire a considerable diameter. Their appearance undergoes an insensible change; the surface is rough, reddish, and presents a

* *Clinique des maladies des enfants.* Paris, 1838; p. 337.

greyish speckling formed by the exudation of plastic matter around the orifice of the absorbent vessels. Each of these points extends, coalesces with its neighbours, and thence a false membrane results which covers the ulcer and becomes organized so as to constitute the dermis. Thus their cicatrization is brought about. The work of reparation does not take place as in ordinary wounds; so far from being effected by the circumference, it commences by the centre and takes place by means of the false membrane to which we have just alluded, which becomes organized and is covered with a fresh epidermis.

After cicatrization, reddish, copper coloured spots remain which might be easily mistaken for papular syphilis if we were not aware of their origin.

The erythema of the malleoli and of the heels is also the result of irritation of the skin by irritant matters; but we must take into consideration the repeated frictions of these parts, which slightly changes the nature of the inflammation.

The erythema is only observed on both heels and on the internal malleoli, that is to say on those parts which are reciprocally rubbed in the movements of the child. This redness rapidly gives place to deep ulcerations, with a greyish, dry base, and irregular edges, which project and are of a phlegmonous redness.

The ulcerations of the buttocks, thighs, and genital organs, persist as long as the cause which originates them; they are kept up by the irritation produced by the excrementitious matters and they begin to cicatrise when the frequency of the alvine evacuations is lessened. However, there is one circumstance which is very much opposed to the cicatrization of these wounds; I refer to the repeated frictions to which they are subjected. In fact the patient requires to be changed as soon as the linen is soiled; it is unswathed and the wounds are necessarily interfered with. The dressings, which adhere more or less to the ulcerations, are disturbed, the adhesions are broken, blood flows, and this happens every time the child has to be cleaned. It is impossible that amidst such manœuvres cicatrization can readily take place.

These ulcerations are sometimes the cause of swelling and inflammation of the scrotum, gangrene of the vulva, and erysipelas in very young children. They must be most carefully attended to in order to avoid such accidents and to ease the pain which they occasion.

Attention to cleanliness is of the utmost importance to bring about the cure of erythema and ulceration of the buttocks, thighs, and malleoli. Bathing the child, washing it with decoctions of aromatic herbs, changing it as soon as the linen is soiled, powdering the wounds with lycopodium, and the application of soft linen rag, are the principal means of treating this disease. Perfumed lycopodium powder is the

best to sprinkle over the fissures of the skin of children. It protects them in the most perfect manner, for it is not pervious to liquids, and water runs off its surface. Powdered starch, on the contrary, becomes moistened and forms a crust which becomes difficult to remove. Care should be taken not to make use of metallic powders, the salts of lead for example, as has been sometimes done, at the risk of bringing on lead cholic in children (Chaussier.) Most of these substances are very active, and although insoluble, they may be absorbed, and determine the most serious symptoms. I may here instance the terrible case of a child inadvertently poisoned by the mother sprinkling over a fissure in the inguinal region a pinch of corrosive sublimate. There was not time for the eschar produced to become detached; for the child died on the eighth day in a state of the most complete mercurial cachexia, with gangrenous stomatitis and gangrene of the mouth, accompanied with loss of all the teeth.

If these ulcerations of the thighs are large and numerous, and if it appears insufficient to treat them by emollients and powders, they should be protected by a simple dressing, which should be renewed as soon as it has become soiled. Cerate is the best application to make use of. It should be spread upon a piece of lint and kept applied by a bandage; but this is not absolutely useful, for its place may be perfectly supplied by the first layer of the swathing. It is however more appropriate to employ it so as not to allow all the child's clothing to be soiled.

Ulcerations of the internal malleoli require the same care as those we have just alluded to; only it is necessary, in order to favour their cure, to prevent the reciprocal friction of these parts. The first layer of the swathing is sufficient to ensure this result. It should be employed to envelop each limb so as to isolate it from its fellow, and the other clothing applied above as usual.

CHAPTER II.

ON INTERTRIGO, OR THE FISSURES WHICH ARE FORMED DEEP IN THE FOLDS OF THE SKIN.

Fissures of the skin form a variety of the *intertrigo* of the ancients. They are met with in very fat children; are seated in the folds of the groin, thighs, and neck; are more especially observed in the situations where the skin forms deep folds, when two cutaneous surfaces are continually in contact; they commence by a slight redness accompanied by mucous moisture, and followed by erosion of the dermis.

These fissures are prevented and cured by attention to cleanliness, baths, and by powdering with starch, or better still with lycopodium, the parts as soon as they are observed to become red.

CHAPTER III.

ON GOURMES.

The term *gourmes* was formerly applied to certain eruptions of the face, eyelids, and scalp, with or without swelling of the glands of the neck; it was considered that these diseases were salutary and destined to expel from the economy certain deleterious principles contained in all children. It was a matter of necessity that the *gourmes* should come out, and should not be interfered with, under pain of determining serious symptoms at some future time.

This term has now lost all its value in the eyes of the medical world, who look upon *gourmes* as a very complex disease, as frequently a local as a general one, and which we should sometimes endeavour to cure and sometimes leave alone in consequence of the bad state of the constitution of the children. It is now only the vulgar who systematically would leave *gourmes* to themselves so as not to lead to the injury of their children's health. Under the term of *gourmes* must be ranked impetigo and eczema, that it is to say all the eczematous and impetigenous diseases of the skin, face, eyelids, scalp, and several scrofulous affections of the glands of the neck.

1st. On Impetigo.

Impetigo is characterized by the presence of cutaneous pustules, of small size, irregularly scattered, most frequently close together, and which generally form thick, irregular, yellowish crusts.

The impetigo of children is observed on the face and scalp. It is very important to distinguish between this difference of seat, for the disease presents different characters in each of these regions. The impetigo of the face preserves its ordinary characteristics; but the impetigo which is developed on the scalp is so much modified that it has been confounded with another disease of the pericranium which has been ranked amongst the group of tinea. The term tinea mucosa was applied to it, to distinguish it from ordinary tinea.

On impetigo of the face. It appears at first under the form of red patches, more or less distinct, slightly elevated, which become covered with small pustules slightly projecting above the surface of the skin. These pustules burst and become covered with a drop of liquid which

dries and forms a semi-transparent yellowish crust. The eruption may be more or less extended, and formed of more or less numerous pustules. It is sometimes sufficiently confluent to form a large surface, in which it is impossible to recognize the primary element of the disease. This portion of the skin is covered with soft, yellowish, semi-transparent crusts, termed *crusta lactea*, which are very easily detached and are almost immediately reproduced. The circumference is reddish, as if erysipelatous, and pustules of unbroken impetigo are often observed, which soon become united with those which are already agglomerated. It is thus that the disease extends further every day.

When the pustules have coalesced so as to form a rather circumscribed surface, the disease is termed impetigo *figurata*; the epithet *sparsa*, on the contrary, is applied to that variety in which the pustules are scattered and disseminated over the face.

Impetigo of the face attacks the cheeks, lips, back of the ears, and eyelids. That which occupies this region is the most serious, for it is sometimes the origin of ciliary blepharitis, and often causes acute inflammation of the conjunctiva.

This eruption is accompanied by slight pain, itching, and a very disagreeable sensation of considerable heat. It does not sometimes last more than from fifteen days to three weeks; at other times it is prolonged for several months; in this case it is almost always allied to a bad constitution, the strumous diathesis, for example. When the impetigenous crusts are completely detached, the skin preserves for a long time a reddish tint, which finally disappears, and which sufficiently indicates the seat and form of the disease.

Impetigo of the face is not of itself a serious disease, for it is very easily cured; it is only of importance when it becomes developed in scrofulous children, and when it affects the eyes or ears. It then becomes the origin of interminable scrofulous ophthalmia, and is the cause of swelling of the glands at the side and back of the neck, in the same manner as excoriation of the toes occasions enlargement of the inguinal glands. This complication is a very serious one, for the enlargement of the cervical glands of a scrofulous child disappears very slowly and often does not disappear at all. The glands remain swollen, and become transformed into tubercular matter, and thence cold abscesses result, which opening externally, leave on the neck ill-conditioned wounds and indelible cicatrices.

2ND. ON IMPETIGO OF THE SCALP—MUCOUS TENIA.

There are two varieties of impetigo of the scalp; *impetigo larvalis*, and *impetigo granulata*.

1st. When the pustules of impetigo are developed on the head and when they are very numerous at the same spot, they cause a very

abundant mucus oozing which exhales a very nauseous odour; yellow crusts form and cover the surface of the scalp; they cause agglutination of the hair under the form of large irregular layers which mask the subjacent raw surface. This is what is termed *impetigo larvalis*.

It is accompanied by rather acute pains and insupportable itching, and it may be, like impetigo of the face, the cause of inflammation and suppuration of the neighbouring glands. When it extends from the head to the ears and face, it assumes the character of the preceding variety, and, like it, it becomes the origin of otitis and very severe ophthalmia.

2nd. *Impetigo granulata* is characterized by the presence of small, whitish pustules, isolated, developed on the scalp, at the base of the hairs which cover it. Greyish crusts succeed these pustules when they have burst; they dry up, and form round several united hairs, small dry granulations of a greyish colour, of a greater or less size, and moveable at the base, when a pedicle is observed which is only the hair. These crusts are sometimes in very great number, and the head is covered with them; they easily become detached, and are very rapidly reproduced.

Like the preceding, this variety is accompanied with intolerable itching. Like it, also, it is the cause of inflammation and suppuration of the glands of the neck. It exhales from the head a nauseous odour of such a disagreeable nature, that in children imperfectly looked after, it is impossible to remain near them. This odour is not present when care is taken to wash and properly cleanse the heads of the patients.

The hair is not always destroyed in impetigo of the scalp; it falls off, but reappears after the cure of the disease. *Impetigo larvalis* and *impetigo granulata* only invade the surface of the skin; they do not extend into the interior of the *cul-de-sacs*, in which the hair bulbs are found, and which are not affected.

The two varieties of impetigo, which constitute mucous tinea, are observed in young children. The first is most frequent in infancy at the period of the first dentition, and the other variety preferably attacks children of more advanced age, who are approaching the second dentition. It is also as much observed in strong and vigorous subjects as in those whose constitution is bad or ill-conditioned.

Mucous tinea is a rather tedious disease which lasts several months at least, and sometimes continues beyond a year. In this case it is the fault of the parents, who will not give attention to this disease, and who encourage it in the intention of purging the children of the humours which they suppose exist in their organism. Thus, impetigo left to itself is a very tedious disease, which heals with difficulty. On the contrary, when the proper plan of treatment

is applied, it disappears very rapidly. The cure of it is generally easy, and is accomplished in three or four weeks at most.

Treatment.

The treatment of impetigo involves one of the most serious medical questions, and one of the most difficult to resolve. Ancient writers made scruple of curing this disease, in the fear of bringing on serious morbid symptoms in the children; some moderns, on the contrary, very decidedly declare for the impunity of this cure.

What are we to believe, and which of these opinions must we adopt? If we consult facts, which, in truth, should constitute the law in such a case, we should endeavour to cure the impetigo, for no immediate unfavourable symptom ever results from its disappearance; besides, we get rid of a rather serious disease which is incessantly extending itself, and which determines otitis, ophthalmia, inflammatory enlargement of the glands of the neck, a very unfavourable circumstance in scrofulous children.

But we must not only consider the results of the moment, we must follow up the patients in the course of their existence in order to determine if the cure of the impetigo is not the origin, as has been stated, of a vitiation of the organism, revealed by serious lesions, such as scrofula of the neck, articulations, lungs, &c. It is a difficult matter to form this appreciation, for we lose sight of the patients, and those with whom we meet again are not in sufficient number to decide the question. Now, supposing that several children become scrofulous, there is nothing to prove that the cure of the impetigo is the cause of it; for a great many children become scrofulous and have pulmonary tubercles without having had *gourmes;* and besides, impetigo itself is sometimes a manifestation of the scrofulous disease. Moreover, in these last, the development of the scrofula is very evidently independent of the cure of the impetigo.

Observation has not then demonstrated that the cure of *gourmes* is the sure cause of the approaching development of scrofula. This is not even probable, and when it manifests itself, it is because the children previously, by reason of their constitution, were liable to this disease, of which impetigo was only one of the first symptoms. On the contrary, it is proved that the cure of impetigo is not followed by immediate unfavourable symptoms, and that it preserves the children from the development of a host of very serious diseases. Impetigo should, then, be cured.

However, in order to reconcile the various opinions, I would say, that the impetigo of strong and robust children, born of healthy parents, may be cured without fear of future bad symptoms. On

the contrary, the impetigo of weak and scrofulous children, of a strumous race, should be treated with more circumspection; it should be gradually eradicated, internal remedies, purgative and tonic, being at the same time administered, in the aim of fortifying the constitution and of determining to the alimentary canal, the flux, salutary perhaps, from the cutaneous surface. We should, at the same time, always keeping in view the diathesis alluded to, apply a supplemental drain at the arm, which should be kept open for several weeks. Nevertheless, if one is to decide between the employment of purgatives and of blisters, I should not hesitate to proscribe this last mentioned remedy which possesses the inconvenience of determining a fresh impetigo on the arm of those children which have really an impetiginous diathesis.

Impetigo of the face and impetigo of the scalp require the use of the same remedies. At the commencement of the disease, cooling, acidulous drinks, baths, emollient lotions and slight purgatives, should be prescribed. Lotions have been recommended composed of woman's milk, the nurse being desired to squeeze the breast so as to wash over the diseased parts. These lotions possess no advantage over the ordinary emollient lotions.

When impetigo has existed some length of time, and arrived at a chronic state, the use of topical astringents should be combined with that of purgatives. The crusts of the face and scalp are to be detached by means of poultices of bread crumbs or of linseed meal; the head should be shaved; alkaline lotions, with the bicarbonate of soda prescribed, or with the sulphurous waters of Enghien, Barége, and Cotterets, with a weak solution of nitrate of silver, gr. j to $\bar{3}$ iss of distilled water, and lastly the liquor of Van Swieten; this last means is the most useful of all. I have seen it very frequently employed by M. Trousseau, and I have always observed it succeed. This treatment should be ordered in the following manner: Detach the crusts; shave the head; apply lotions three times a day for a quarter of an hour with linen moistened with the liquor of Van Swieten, diluted with an equal quantity of water. Care should be taken not to make use of a sponge, which might, from its composition, change the nature of the remedy employed. A slight purgative administered every other day should be added to this treatment.

If the impetigo exists at the same time on the body, baths containing corrosive sublimate in the dose of from fifteen to sixty grains should be used according to the age of the patients. This plan of treatment, I repeat, is one of the most useful that can be employed, and it may be prescribed with the utmost confidence, without fear of seeing any of the symptoms of mercurial poisoning supervene.

CHAPTER IV.

ON PEMPHIGUS.

Pemphigus is a bullous disease of the skin, characterised by an eruption of rosy patches, followed by bullæ, filled with liquid, and by thin lamellar crusts.

Pemphigus, which is observed in the adult under the *acute* or under the *chronic form*, is always developed in children at the breast as an acute disease.

There are two kinds of pemphigus; the *simple infantine pemphigus*, and *syphilitic pemphigus*. This latter will become the object of a special chapter incorporated in the history of the syphilis of infants.

Simple pemphigus is never congenital; it appears one or several months after birth, under the form of more or less numerous bullæ, surrounded by a rosy areola, filled with clear serosity, either limpid or slightly opaline and diffused over the whole body on the surface of the skin, without involving its tissue under the form of ulceration. These characters may alone serve to distinguish simple pemphigus from syphilitic pemphigus, which is especially developed on the palms of the hands and on the soles of the feet; but there are in addition commemorative circumstances, which, by indicating in the parents the existence of a recent or distant infection, present a still more convincing element of proof.

Simple pemphigus is usually the result of poverty or of want of cleanliness.

Exanthematous patches are first observed on the skin, over all the body, then, at the end of twenty-four or forty-eight hours, bullæ are formed, at first discrete, but sometimes very numerous over the entire body. They are filled with clear serosity, of a yellowish colour, sometimes opaline, then they dry up and shrivel. Thence a small wound results which becomes covered with a thin, yellowish, lamellar crust, which adheres for some days and then falls off without leaving any traces except a reddish spot.

In young children, the eruption of pemphigus is apyretic, accompanied with a more or less intense fever. It is usually apyretic.

It lasts from seven to eight days, is not at all a serious disease, and always terminates in resolution.

Baths and diluent drinks constitute the whole of the treatment of pemphigus. If the bullæ are very large, they should be evacuated early with the point of a needle, so that the epidermis may become

applied to the skin and hasten the cicatrization. Some spoonfuls of the compound syrup of chicory should be given to the children, or calomel in a purgative dose, and a spoonful of the syrup of bark should be administered every day.

CHAPTER V.

ON ERYSIPELAS.

The erysipelas of infants and children at the breast is a very frequent disease and one which it is important should be well understood, in consequence of its singular progress and of its extreme severity. It is more often met with in hospitals than in the city. According to M. Baron, physician to the Hôpital des Enfants Trouvés, it appears that there are always one or several examples in the infirmary of this establishment.

This disease has been described by F. Hoffman: *Umbilicalem regionem in infantibus frequentius infestat, ac inde per abdomen spargitur cum gravibus pathematibus, funesto ut plurimum eventu:* by Underwood, Billard, M. Blache,* and M. Trousseau in an interesting monograph recently published.

Causes.

Erysipelas is nearly always the result of circumscribed inflammation of the skin; it succeeds the inflammation which surrounds the pustule of vaccination; impetigo of the scalp, eyes, or ears; fissures of the thighs, scrotum, and lips; and lastly the inflammation which accompanies the detachment of the umbilical cord. The last of these is the most common cause; and it is to this that the greater number of cases of erysipelas of infants must be referred.

After having pointed out the occasional causes of erysipelas, namely: cutaneous inflammations around the pustules of vaccination, around fissures of the buttocks and thighs, around the cicatrix of the umbilicus, &c., it must be stated that these causes would be without result, did not a totally different influence come in aid of their action. In fact, we every day observe children who present similar morbid changes without erysipelas being the consequence. The individual must therefore possess a predisposition favourable to the development of the disease.

This predisposition is determined by the bad hygienic conditions in which the children of the poor are placed, by the deleterious influence

* *Nouveau dictionnaire de médicine.*

to which they are subjected in consequence of their over-crowding in the hospitals for children, and lastly, by the epidemic constitution of the time. Thus, erysipelas is never more frequent than in the course of the epidemics of puerperal fever. It is to this circumstance that the development of the cases of erysipelas is allied, and not to slight wounds which readily cicatrize in a more favourable hygienic constitution. It is to this epidemic influence that the fatality of the disease should be referred.

Erysipelas is also sometimes the result of imperfect nourishment of the children, or of alimentation by a diseased milk; thus M. Rayer has seen this disease appear in a child who for several days was suckled by a nurse labouring under dysentery. It is not at all impossible that milk altered in its source by unwholesome food, muscles for example, may produce this cutaneous disease.

Symptoms.

This disease usually commences as a local affection, without being preceded by those general disturbances of the alimentary canal which are observed so frequently in the erysipelas of adults. It is not preceded by fever, save in some exceptional cases; when, for example, a violent inflammation of the arm around the pustules of vaccination is the source of the evil. Sometimes, on the contrary, it presents all the symptoms of a general disease which is announced by fever, convulsions, icterus, &c.

As soon as the erysipelas has declared itself, the fever is excited or increases, and is easily recognized by the state of uneasiness, restlessness, and want of sleep into which the young children are thrown, by the thirst which consumes them, by the heat of skin and the degree of the acceleration of the pulse.

At the starting point of the erysipelas, on the abdomen, the head or the limbs, whether this be the inflamed umbilical cicatrix, or the fissures of the skin, or the inflammatory areola of the pustules of vaccination, or lastly, the pustules of impetigo, we discover around all these changes, the skin inflamed to a greater or less extent; it is red, tense, shining, and very hot. Pressure with the finger is very painful, it leaves a slight depression, and causes a whitish colouring which ceases with the pressure, to be rapidly replaced by the usual red colour.

From this point the cutaneous inflammation invades the neighbouring parts; from the abdomen it extends to the pubes, the buttocks, and the lower limbs; from the neck and arms it diffuses itself over the head, the trunk, and lastly the lower limbs. It remains stationary in the same spot from twelve to twenty-four hours, and it is only when it has extended onwards that the parts first invaded lose their

colour and swelling, and assume a yellowish tint before presenting desquamation of the epidermis.

The erratic progress of this inflammation is perfectly well characterized, and every one may follow it by carefully observing the young children who are attacked by it. It propagates itself from one place to another, and it every day occupies a fresh part until it has run over the entire surface of the body.

Sometimes, as M. Trousseau has remarked in the work we have cited, when the disease has become general, this progression is not entirely the same. The erysipelas returns to the parts which it has already occupied, but then it commences in a spot at some distance from its seat without having run over the intermediate parts. The erysipelatous inflammation thus occupies several parts of the body at the same time, but this peculiarity is very rare.

In young children the red colour which erysipelas presents is not very manifest except on the trunk and on the upper part of the limbs. When it extends to the feet and hands the redness is very faint and scarcely to be detected. There is only a slight pink colouring observed there.

The parts attacked by erysipelas are always swollen, as the impression left by pressure of the fingers testifies. This œdema is not always very decided on the trunk, but is, on the contrary, very considerable on the hands and feet, which are very much enlarged and sometimes transparent, as in the cases of general serous effusion. When the face is the seat of the disease, which is seldom the case, it is very bloated, but the swelling is not to be compared to that which is observed in the erysipelas of adults.

Such are the local symptoms of the erysipelas of infants and of children at the breast. The general symptoms at the commencement of the disease have been partly indicated, but they insensibly assume a much greater intensity. The face is exceedingly pale and the lips colourless. The restlessness is very great; continual cries give proof of the suffering experienced by the patients; the pulse is excessively frequent and feeble. Vomiting or diarrhœa are then observed, and sometimes convulsions, which put an end to the existence of these unfortunate children.

Duration—Terminations.

The duration of the erysipelas is very variable. We have not observed a sufficiently large number of cases to give a decided opinion on this point. Nevertheless, we should fix, from our observations and in an approximative manner, the duration of this disease between four and five weeks, a result similar to that which has been obtained by M. Trousseau.

The cure of erysipelas, that is to say, the resolution of the inflammation, is very rarely observed; death is much more frequently the consequence. Thus, in thirty children of from one day to one year old attacked with erysipelas, Billard has reckoned sixteen cases of death. But here it is necessary to establish a distinction between the newly-born, properly so called, and the child of several months; the erysipelas of the newly-born should be regarded, according to the observations of MM. Blache, Baron, and Trousseau, as inevitably fatal; whilst, on the contrary, the erysipelas of children of more advanced age is sometimes cured. I have met with two instances of this favourable termination.

Nevertheless, death is not constantly the result of simple erysipelas. It is equally the result of the *suppuration* and of the *mortification* of the skin, which appears as a complication of this disease, especially in newly-born children. Peritonitis, of greater or less extent, is almost always observed; and sometimes, according to M. Rayer, inflammation of the umbilical vein.

It will be seen that the erysipelas of young children is a very serious disease. All the newly-born die. Subjects of a more advanced age are the only ones who can resist it and recover. Of these there are still very few indeed in whom we can succeed in triumphing over these symptoms.

[Several cases are related (*American Journal of Medical Science;* N.S., No. xl, p. 318) of erysipelas after vaccination, in which some of the children died, and we should be cautious of vaccinating during an epidemic of erysipelas.

Dr. Doepp states expressly that he has found erysipelas most frequent in infants when they had been vaccinated with lymph taken from a highly inflamed pustule or vesicle, and he has been able to affirm this with greater certainty from the results of the practice he has long followed of vaccinating each child in both arms, but with different lymph, and he constantly produced erysipelas in that arm which had been vaccinated with lymph from a highly inflamed vesicle.

In nearly all the children born for several months in Queen Charlotte's Lying-in Hospital, bullæ occurred, which Dr. Copeland says was evidently referable to a more than usually superficial, slight, and uniform kind of erysipelas, which affected the whole surface in many instances, and not any one part in preference to another. The accompanying fever is usually at first of an inflammatory character, attended with much derangement of the alimentary canal, the secretions being always much depravated; but the fever soon becomes typhoid, and the local and general symptoms give evidence of deficient power. Dr. Bromfield mentions the case of a child born with erysipelas who perfectly recovered. The cases of inflammation and ulceration of the pudenda of young children described by Kinder Wood appear to be instances of this disease in its aggravated form.

For further information on the erysipelas of children see my MSS. Essay on Erysipelas, in the library of the College of Surgeons, for which the Jacksonian prize was awarded in 1849.—P.H.B.]

Pathological Anatomy.

We shall not dwell long on the pathological anatomy of erysipelas, for it does not present much matter of interest.

The affected parts are the seat of a more or less considerable œdema, which is especially well marked at the extremity of the limbs. The cellular tissue is here infiltrated with a considerable quantity of serum.

Pus is sometimes found infiltrated in the meshes of the cellular tissue, without being collected into a distinct deposit. We met with this appearance in a child three weeks old, which died after fifteen days' illness. This infiltration existed in the cellular tissue of the anterior abdominal wall and in the cellular tissue of the scalp. The same child had besides, in the peritonæum, a rather large quantity of purulent serosity, and on the viscera albuminous false membranes, very delicate and very easily detached.

Underwood has remarked the same alterations in the bodies of several children: adhesions between the different viscera which were covered with a plastic exudation precisely resembling that which is met with on the viscera of women who have died from puerperal fever.

As already remarked, peritonitis is, according to M. Baron, one of the most constant alterations in young children who die from the disease we are now considering.

In the *post mortem* examinations we have made, we did not observe in the other organs any change which deserves to be mentioned.

Treatment.

Although the erysipelas of infants is very fatal, we should not on that account idly look on. We should endeavour from the commencement to allay the inflammation of the skin by means of energetic treatment.

We should endeavour to prevent it by carefully attending to the cicatrization of the umbilical cord, and by not vaccinating children too early, provided we are not obliged to do so in consequence of an epidemic of small pox raging at the time.

Local abstraction of blood, by means of one or two leeches applied at the circumference of the primary seat of the erysipelas, should be put in force, provided the power of the constitution of the children permits. In the contrary case, we must rest satisfied, as is done at the Hôpital des Enfants Trouvés, in prescribing emollient fomentations, baths, and frequent applications of lard and mercurial ointment.

Hamilton Bell and Charles Bell, of Edinburgh, treated these cases of erysipelas by the tincture of the muriate of iron, two drops in a tablespoonful of sweetened water every two hours, and in addition by a mild purgation with castor oil or calomel.

The attempt has also been made to destroy the erysipelas by means

of topical astringents, such as astringent fomentations of tannin, sulphate of iron and corrosive sublimate, or by means of baths with these substances in solution. Underwood employed fomentations of the acetate of lead, and baths of bark combined with aromatic herbs. The sublimate may be employed in solution, according to Dr. Schott, of Philadelphia, in the dose of gr. j to ℥ iss of distilled water. Fifteen, or at most thirty grains, are sufficient to put into the bath. These experiments have not been followed by all the results expected from them, and it has been discovered that all these means were insufficient to arrest in any decided manner the progress of the disease.

Some have recommended the separation of the healthy from the erysipelatous parts by a strip of blistering plaster, in the hope of circumscribing the disease and of destroying it at the very place of its origin. I have seen M. Trousseau make use of this plan of treatment without any good resulting; and the same was the case with cauterizations with the actual cautery made with the same intention, on the limits of the cutaneous inflammation. The erysipelas has always passed the barriers one would oppose to it, and continued its onward march as above described.

Lastly, we would allude to a plan of treatment mentioned by M. Blache, and which M. Meigs has proposed as very advantageous in the disease we are now considering. This physician has treated many cases of erysipelas in infants who quickly recovered under the use of Kentish's liniment (a mixture of basilicum ointment and spirits of turpentine), applied several times a day on the diseased part.

APHORISMS.

314. The erysipelas of infants is very common at the time of epidemics of puerperal fever, and often results from this epidemic influence.

315. The erysipelas of infants almost always originates in a wound of the skin, and especially in that which results from the detachment of the umbilical cord.

316. The erysipelas of infants is a fatal disease.

317. The erysipelas of children becomes less and less serious in proportion as the child grows older.

CHAPTER VI.

ON NÆVI AND ERECTILE TUMOURS.

The term nævus is applied to certain spots or cutaneous marks with which children are born and which always remain. These are what are called *mother-marks*, or *nævi materni*.

Nævi present several forms, which it is important to separate and which are otherwise easy to recognise. Some are superficial, but slightly vascular, and not susceptible of degeneration; others involve the skin to a greater extent, are very vascular, becoming every day more so, and rapidly constitute so many erectile tumours. To the first, I apply the term of *superficial pigmentary nævus*, and to the others the term of *erectile nævus*.

The production of these nævi is generally referred by the vulgar to flights of the imagination, to impressions or to unsatisfied caprices of the mother. The occasional singular form of this cutaneous alteration, in which some put on the appearance of cherries, raspberries, mulberries, strawberries, the head of an animal or of any other object, would appear to justify this more than dubious etiology. But there is nothing in this respect which has been clearly proved, and all that has been stated on this point is only fantasy and pure credulity. Without in any way denying the all-powerful influence of the mother over the physical dispositions of the fœtus, of which there is now no want of proof, we must wait for sufficient motives of belief in order to admit the reality of this intervention. In the present state of science we are entirely ignorant of the cause of the development of nævus.

Superficial pigmentary nævus presents itself in every part of the body, but more frequently on the face, eyelids, and lips; it is usually well defined under the form of limited or very extended patches, it is not sensibly raised above the surface of the skin; its uniform colour varies from a bistre to a deep brown, from a dull red to a blackish blue; it changes slightly during the movements of expiration and during the cries of the child. Its surface is tolerably level, usually smooth; sometimes covered with silky, fine hairs. These patches do not generally increase in size, they remain stationary both as regards structure and volume; they extend in proportion to the parts which support them. They are not susceptible of degeneration if they are not irritated, and they thus remain during the whole duration of life.

They are formed by a superficial alteration of the skin which does not extend into its thickness. Well supplied with vessels and with pigment, as MM. de Blainville and Rayer have proved them to be, and who term them *pigmentary patches*, they appear to occupy the mucous tissue of Malpighi.

As the superficial nævus does not cause pain, and possesses no other inconvenience than that of deformity, we should leave it alone and not yield to the advice of those who would cause their disappearance by means of the suppuration of a blister and of a superficial scarification by Plenck's paste, composed of equal parts of quicklime and Venice soap. This paste, which is to be kept applied for twelve hours in order to produce a sufficient eschar, possesses the serious inconvenience of producing acute inflammation, and of often leaving behind a cicatrix of greater deformity than the spot to be destroyed.

There is scarcely more than one appropriate means to be employed in causing the disappearance of one of these spots, and this is tattooing; but this is only useful in a very limited number of cases, when the spot is very superficial, and of a not very great extent of surface. The skin is to be rather deeply pricked at slight intervals, and in each puncture oxide of zinc or calcined magnesia, mixed with a little minium, is to be introduced. This is to be repeated several times, and thus a pink and white colouring of the skin is obtained, so as very much to improve its appearance and to hide the deep red morbid tinge of the integuments.

The *erectile nævus*, which M. Rayer includes in the category of vascular spots, is a more dangerous cutaneous alteration, and may sometimes be the origin of serious symptoms.

Several of these may be observed on the same individual, but generally, *erectile nævus* exists alone. It is developed on all parts of the body, but is more frequently observed on the face, the head, and the neck. It may exist in a high state of development at the time of birth, or simply under the form of an imperceptible spot, resembling a fleabite, which increases in size on the following days. Its form is that of a spot or speck of a red or blackish brown colour, in other cases, on the contrary, of a reddish livid blue patch, sometimes granulated, flabby. It at length presents itself under the form of a tumour, more or less well defined, of the size of a nut or a walnut, sometimes very projecting and almost pedicellate, occasionally occupying the whole of the dermis and extending itself beneath it. This is what characterizes the *true erectile tumour*. I have drawn, for A. Bérard, one of these congenital nævi in a woman thirty-two years old, whom I daily meet near my dwelling. This venous nævus had invaded the whole of the right side of the face, had become tubercular, like an elephantiasis, and had given rise to an erectile appendix on

the upper lip the size of the fist, suspended by a pedicle as large as the finger. A. Bérard wished to operate on this woman, which she properly refused, if we are to judge by the result. In fact, ten years have elapsed, and she is still alive and in good health. This nævus has slightly increased, whilst an operation might have caused her death, and certainly, in my opinion, would not have removed all the disease.

This form of nævus is eminently vascular. Numerous extremely fine vessels, anastomosing with each other, sinuous and dilated, forming ampullæ, compose its tissue, which S. L. Petit described under the name of varicose tissue, and which others have called fungous and aneurismatic. From the examination which has been made of them it is evident that these nævi are composed of an agglomeration of capillaries enormously dilated and disposed into spaces in which the blood circulates as freely as water in a sponge, and in which it may enter and flow out with as equal facility. It is a true spongy tissue which pressure empties and which assumes its former size when the pressure is removed. A. Bérard has injected one of these erectile tumours of the lip by the arteries and veins. The injection by the carotid did not penetrate it at all, and the injection by the veins succeded but very incompletely. Several large veins became filled, the mass of the tumour remained like areola tissue. It furnished, under the undulating pressure of an instrument, a thick bloody liquid resembling the detritus of the spleen. It was formed of lamellar filaments, the canaliform cavities of which communicated freely with each other.

M. Nélaton has also studied the anatomical disposition of the vessels of a nævus of the lower lip which gradually constituted an erectile tumour. The mass was formed by canals, resembling veins, of the diameter of a quarter of a line at most. It was impossible to follow a trunk and the ramifications analogous to those which veins form in the normal state. Each canal, unprovided with valves, presented lateral openings which were continued into other canals. Their walls were thin, and extremely resisting, as if fibrous. Lastly, an injection introduced at any part of the tumour escaped from the entire surface of the section.

Nævi are then formed of venous or arterial capillaries, anastomosing and distorted, or by arterial and venous capillaries at once united, but to judge of them from the colour and absence of pulsations, the venous capillaries are those which predominate; thus these nævi have been described under the term of venous erectile tumours. When the arterial vessels are the most numerous, the tumour is the seat of pulsations synchronous with those of the arteries, but this is a very uncommon form. I am not aware that it has ever been met with

in the child as a congenital alteration. I have only met with it in the adult where it develops itself accidentally.

If the diagnosis of *erectile nævus* sometimes presents difficulties in the adult, the same is not the case in the newly-born child. The red or violet colouring of the diseased skin, its unequal swelling, softness, vascularity disappearing under pressure of the finger and becoming more decided during the cries and in straining movements suffice to indicate the nature of the disease and of the erectile tumour, if this is already formed. At least there can be no mistake at this age, and one would never confound erectile nævus with abscesses, aneurisms, and fungous encephaloid tumours so common at a more advanced period of life.

Erectile nævus, in its different states, from its origin in a small vascular speck to a spongy tumour filled with blood, may remain stationary after birth; but it usually increases in size, and becomes gradually dilated under the influence of straining and of the cries of the child; it tends to ulcerate, and to occasion, when it bursts, prolonged suppuration or a hæmorrhage which is sometimes fatal.

We should then, as soon as the age and health of the children permit, employ suitable means to arrest the progress of these nævi, or to totally destroy them, if we have any fear of their rapid growth.

When the erectile nævus remains stationary, we may wait and temporize without fear; we should probably always temporize; if it appears to increase very gradually, we should watch its progress, and await for the attainment of the age of three to four years before practising an operation; if, on the contrary, the development is rapid, if suppuration has set in, if hæmorrhage is imminent or has already taken place, we must operate, and that as soon as possible.

Some examples of well-chosen temporization, followed by success, demonstrate, however, to the practitioner what nature may effect if left to herself, and how important a matter it would be to know the natural progress of all diseases.

I see daily amongst my relations a gentleman, forty-three years old, who came into the world with a nævus as large as a nut, situated at the side of the neck; this tumour had slightly increased, and he was about to be operated on, at the age of ten years, when his mother most strenuously objected to it. The tumour is now shrunken, and forms a black patch, without substance, on the surface of the skin. MM. Allier, Monod, and Watson have related facts of this kind, and others have been observed by M. Moreau, who has communicated them to M. Vidal. They merit the most serious attention.

A child is born with a red mark on the cheek. This mark at first resembled a fleabite; during the first months of existence there was no sensible progress, but at the end of the first year it was perceived that the spot where the mark was had

raised itself above the surface of the skin. This tumour increased in size during the cries of the child, and became of a deeper colour. From the first to the fourth year it still further increased in size, and assumed the form and size of a fine cherry. M. Moreau recommended the tumour not to be touched, several cases having taught him that it might disappear spontaneously. Dupuytren was afterwards consulted, and considered the tumour a very serious affair, and recommended immediate extirpation. Boyer, who was also consulted, pointed out the dangers of extirpation, and recommended compression of the tumour. Dubois sided with M. Moreau, and temporization was adopted.

The child grew, the tumour remained at first stationary; then, towards the age of seven or eight years, began to lose colour and shrink. The redness and consistence of the tumour disappeared very gradually; a pouch remained which resembled the pericarp of a very withered fruit; at twelve years of age no trace of this nævus remained.

Another child presented at the time of birth, on the middle and top of the forehead, at the origin of the hair, a nævus having the appearance of a cherry. At eight months old, when M. Moreau saw the child for the first time, this tumour was of the size and of the form of the first phalanx of the middle finger of an adult. Gall, who had been consulted, referred the patient to Dupuytren, who recommended its extirpation. M. Moreau, fearful of the dangers of an operation practised on the head of so young a child and in the neighbourhood of a fontanelle, was in favour of an adjournment; 1st, because the operation, at a later period, would be less dangerous; 2nd, because, by temporizing, it might be seen if this nævus would disappear.

The child accompanied her parents, who were travelling to Sweden, where she remained until the age of sixteen years. Temporization had been adopted. M. Moreau saw this girl again on her return to Paris, and observed no trace of the tumour of the forehead.

Another child, the daughter of a money changer, was born with an erectile tumour of the same kind, in the thickness of the left greater labium, where it extended into the vagina. M. Moreau again proposed temporization, which was approved of by Dubois. Dupuytren had proposed excision. The parents followed the first recommendation, and nature caused the disappearance of this tumour, which could not have been removed without the greatest danger.

But things do not always turn out so fortunately. In a great number of children the tumour grows rather quickly and threatens an approaching rupture; in this case we must lose no time in effecting its disappearance. The operation does not present any difficulties when the alteration remains circumscribed by a large surface of healthy skin, and removed from important parts. It is, on the contrary, a very intricate operation when the nævus is seated on the lip or eyelids, where a loss of substance may be a very disagreeable circumstance. On the eyelids especially the proximity of the eye very much impedes operative manœuvres.

Treatment.

Various means have been employed with the intention of eradicating erectile nævi by their direct destruction, or by their transformation into a cicatrix-like tissue, not susceptible of vascular degeneration.

Vaccination and the inoculation of tartar emetic, acupuncturation and caustic injections, ligature and compression, sometimes succeed in transforming the erectile nævus into fibro-cellular tissue, extirpation and cauterization destroy the disease more effectually, and entirely remove it.

Vaccination is an excellent means to employ in the treatment of erectile nævi which are not too diffuse nor of too great size. It does not enjoy all the favour it inspires me with and which it deserves. By the same operation it remedies the eventualities of small pox and the consequences of a very much to be dreaded cutaneous lesion.

Vaccination should be practised by numerous punctures about a quarter of an inch apart, disposed round the circumference of the nævus, and some on its surface. When this inoculation succeeds, the pustules appear and become developed as usual. At the seventh or eighth day, a very acute inflammation, sometimes alarming, is manifested, and extends deeply into the vascular mass of the nævus, which swells and becomes very painful. Then, when the eruption of vaccination dries, the inflammation which surrounds the pustules diminishes, and the nævus, very much changed and half destroyed, gradually shrinks and disappears at the end of some months under the cicatrices of the vaccination. Many practitioners have already succeeded by this procedure, which I have twice employed with perfect success. M. Boyer made use of it, for a rather large nævus of the cheek and of the lip, and he observed the transformed parts gradually resume nearly their natural disposition. M. Marjolin has had recourse to it in a case which did not appear a favourable one on account of the extent of the lesion; but, notwithstanding, it succeeded.

It was in a child six weeks old. The erectile nævus occupied half of the cranium and of the face, existing not only on the skin, but invading the mucous membrane of the same side, being observed in the eye, on the internal surface of the cheeks as far as the velum of the palate.

Every one considered this lesion as beyond the resources of art.

The child had not been vaccinated. M. Marjolin conceived the happy idea of profiting by this circumstance, and resolved to try vaccination as the therapeutic treatment of the nævus. He made a dozen punctures only on the limits of the tumour. Some occasioned hæmorrhage which was with difficulty arrested; a rather acute inflammation followed, and when it ceased, the tumour began to diminish in size. At the end of four years, the cure appeared complete; there only remained a slight swelling below the upper eyelid, at the labial commissure and at the velum of the palate. On the forehead, head, and cheeks, whitish traces were observed precisely like the tissue of a cicatrix. Cicatrization was sufficiently perfect to resist a fall which happened to the child, from which a contused wound of the forehead resulted which was not followed by hæmorrhage.

That vaccination may then possess great advantages in the treatment of nævus, the facts which have just been reported, the number of which

could be much increased by citing the archives of the vaccinations of the Academy of Medicine, are the best proofs. It is by this means that we should always commence the treatment of nævus, reserving for the second trial, in case of failure, the other modes of proceeding which science possesses and which I shall now briefly mention.

In place of vaccinal inoculation, inoculations with tartar emetic have been employed, which produces voluminous pustules, analogous to the pustules of vaccination, with the exception of their form.

This is a very ingenious idea, to which I cannot but be favourable, but it is a difficult matter for me to form a decided opinion upon it, for it has yet been but very rarely put in practice.

Compression may be very useful when the erectile nævus is situated on the forehead, temple, lips, &c., or on any other part which can be easily compressed against a bone. In this case a bandage ingeniously prepared, and a special one for each case, applied during the day, removed at night, and continued for two or three years, has sufficed to lead to the complete obliteration of the dilated capillaries. The remarkable case related by Boyer is well known, in which this surgeon, being fearful of removing an erectile tumour of the upper lip extending into the nasal fossæ, recommended the employment of compression. The mother of the child took the case in hand and compressed the tumour seven hours a day, by pressing with the finger transversely applied on the lip and moistening it with a solution of alum. She obtained a complete cure.

Fabricius Hildanus, and J. L. Petit, recommend the removal of the tumour by a cutting instrument, but it should be removed a little beyond the altered tissue, so as, on the one hand, not to risk a return of the disease, and, on the other, to avoid hæmorrhage. M. Roux, in a case of nævus of the forehead which he was about removing, has seen syncope supervene, which made him for four hours fearful of the life of the child. Wardrop had a child ten days old die under his hands from whom he was removing one of these tumours as large as half an orange, situated at the posterior part of the neck. In some cases where the tumour is situated on the lips of the mouth, or the prepuce, or on the greater labia, the subjacent part is removed in order to cure the disease, and a loss of the substance of the lips is occasioned as in hare lip; the prepuce is removed, &c.

Wardrop has recommended the ligature of the principal artery which supplies the tumour so as to facilitate its extirpation. This means has several times succeeded with him.

Lawrence has proposed ligature of the nævus. By means of a needle carrying a double thread, the middle of the base of the tumour is transfixed, and he has thus a double thread, which being tied tight round each of these hemispherical halves, causes them to shrink and disappear. He has related several cases of cure by this method.

Other surgeons employ caustics, and recommend them as the best means for the destruction of the nævus, and not without reason. The actual cautery has been used; M. Farral has proposed caustic potash, whatever may be the seat and the volume of the tumour. A. Bérard has recommended the use of Vienna paste, with which he is perfectly satisfied. I have used it after his recommendation, and have perfectly succeeded.

A child eleven months old, vaccinated, whose father had a small stationary nævus on the shoulders, was born with a red patch on the right temple. This patch was of the size of a bean, had increased, projected, and formed a tumour of the size of a nut. It was soft, easily depressed by pressure, of a blackish red colour, becoming nearly black when the child cried. A single application of the Vienna paste for ten minutes, by means of a cylinder limiting the action of the caustic, was sufficient to form a deep eschar, involving the thickness of the altered tissue. In fact, at the end of several days, under the influence of diachylon, the eschar separated from the healthy parts; it was detached on the fifteenth day, and the wound was followed by a well-formed cicatrix which continued perfect.

The application of the caustic is not very painful, although the children cry very much. A more or less red colouring is observed round the tumour, accompanied with slight swelling. A little blood sometimes flows from the mortified nævus, but this flow is never very abundant, and at the end of some hours entirely ceases.

When the nævus is of small size, a single application of the Vienna paste is sufficient to destroy it entirely; in the contrary case, the base of the disease is not comprised in the eschar, and we observe below this layer vascular granulations in suppuration, the presence of erectile tissue from the more decided colour of some of the fleshy granulations. If the layer of morbid tissue appears of slight extent, it may be left to itself. In proportion as the cicatrization is affected, the granulations are observed gradually to shrivel, to assume a natural colour as in simple suppurating wounds, and the mere application of the nitrate of silver suffices to reduce them.

But supposing the rest of the tumour seems disposed to persist or to assume a fresh growth, we should make use of a second application of the Vienna paste. This second application may be made as soon as the eschar is detached, and while the wound is suppurating, or, better still, when this is entirely cicatrized. It is better to wait until the wound is entirely healed, which takes place in the space of from fifteen days to three weeks, in order to make a fresh cauterization, excepting in the case where the rest of the tumour makes rapid progress in its reproduction.

Cauterization of the tumour by Vienna paste, when it is possible, possesses the advantage of not exposing the children to any primitive

or consecutive accident similar to those of extirpation, ligature, and setons.

After the cicatrization there remains, in the place of the nævus, a white surface, on the same level as the neighbouring tissues.

The following is a good instance of cure obtained by A. Bérard, by means of three successive applications of the Vienna paste.

A little girl, six months old, had a nævus at the point of the neck. Shortly after birth they remarked on this situation a small red spot, which had been mistaken for a fleabite. This spot had progressively increased in size and in height. Its summit was ulcerated in two or three places; thence suppuration without hæmorrhage resulted, followed by a slight shrinking at the ulcerated part. As to the rest it made extremely rapid progress, and the tumour had acquired more than an inch in diameter. It was not the seat of any pulsation.

The Vienna paste was used and kept applied for about six minutes. The eschar appeared rather deep. The tumour ceased to make progress; the portions which the caustic had not immediately disorganized are more hard than before the operation, and no longer swell during the cries of the child. Suppuration is established round the eschar and through several points of its thickness. Without waiting for it to be completely detached, Bérard made a second application of the caustic six days after the first; the tumour was entirely covered over by the paste, which was kept on about seven minutes. The eschar presented a black colour and great hardness. The general health did not appear disturbed; the local inflammatory action is feeble, and the nævus shrinks more and more.

On the detachment of the eschar, several points still presenting a suspicious appearance, a third application of the caustic was made. This time the paste did not remain applied more than five minutes. The local and general consequences of its application were the same as in the two first cauterizations; as to the tumour it has entirely disappeared; granulations of good appearance succeeded the separation of the eschar; and the wound soon became covered over by a white and even cicatrix. Several months after the complete cure there was no symptom of the reproduction of the disease.

According to M. Lallemand, the most certain method of bringing on the inflammation of the diseased parts, and the obliteration of the vessels, would be the employment of acupuncturation followed after his manner; a certain number of insect pins or acupuncture needles are introduced into the tumour, and they are left several days in position until they have caused a sufficient amount of inflammation. They are then withdrawn, and the cicatrization obliterates a part of the nævus. The treatment is renewed, and several successive applications are usually followed by a perfect cure. This mode of proceeding has been modified by several surgeons who employ needles at red heat, and by Macilwain, Monod, and Curling, who, on the withdrawal of the needles, place in their apertures lengths of thread in the form of a seton, which they leave to cause suppuration for several months.

In this manner M. Monod operated on a little girl nine months old, and who is now fourteen years old, and who presented an erectile nævus situated on the face,

over the left inferior maxillary bone, in no way projecting into the mouth. He introduced numerous needles, supported by threads as in the twisted suture. At the end of ten days, the course of the needles was in full suppuration ; they were withdrawn, and small setons were introduced and retained for a year ; they succeeded in curing of the disease. The cicatrix is scarcely visible, is supple, and not resisting.

Another child, seven years old, had a venous erectile tumour on the palm of the hand at the situation of the articulation of the first phalanx of the index and the corresponding metacarpal bone. The tumour was in intimate relation with the flexor tendons. M. Monod treated it by setons.

The needles were first introduced and allowed to remain fifteen days. They were replaced by setons renewed every thirty or forty days for five or six months.

The child was cured, and the movements of the finger remained free.

Lloyd and A. Bérard have also made some additions to the ingenious method of M. Lallemand, these are the injections of nitric acid and of the acid nitrate of mercury in the canals opened by the pins or needles. I have several times seen M. Bérard have recourse with success to this method in which I have sometimes assisted him. He used a glass syringe furnished with a small platinum canula proportionate to the diameter of the holes of the needles.

A girl, two years and a half old, presented in the thickness of the right cheek and the right half of the upper lip, a tumour of an erectile nature. Nine months previously the superior portion of the tumour had been transfixed by fourteen small setons which produced suppuration and ulceration of the parts comprised between them and the skin. After the cicatrization of the wounds, the tumour slightly decreased at this part, and continued to increase in all the others.

A disease attacking the child caused the adjournment of the application of fresh setons.

M. A. Bérard introduced into the cheek six pins of large calibre. After three days they were withdrawn, and the acid nitrate of mercury injected into the openings. The cheek became red and hard in consequence ; obstinate and abundant vomitings came on during the two following days, accompanied with retention of urine, extreme feebleness, smallness and frequency of the pulse. The cheek tender, red, and very painful ; suppuration established in the whole of the tumour. An eschar of from one half to three quarters of an inch in diameter formed near the old cicatrix. The general symptoms gradually ceased, nevertheless the debility continued for several weeks, and some vomitings occasionally recurred.

The modifications of which the tumour was ulteriorly the seat had for their result the diminution and the transformation of a part of its tissue into a fibro-cellular substance ; nevertheless it was necessary after some months interval to have recourse to needles, followed by the injection of the acid nitrate of mercury. The injection each time caused the return of vomiting and brought on very decided local phenomena of inflammation, although less violent than they had been at first.

Six months after the commencement of the treatment, no traces of erectile tissue were observed, on the cheek or lip, either on the side of the skin or of the mucous membrane of the mouth ; only these parts appeared to be hypertrophied.

M. Bérard wished to wait before having recourse to a fresh operation, and in fact the parts have gradually diminished during the three years which followed the cessation of the treatment. This diminution would have probably continued

spontaneously, but the anxious parents wished that excision should be made of what was exuberant, and a rather deep excision on the internal surface of the lip and of the cheek restored the parts to nearly their normal disposition.

In those cases in which cauterization by Vienna paste is not applicable, acupuncturation, combined with injections of acids, may be employed; only, instead of the acid nitrate of mercury, which nearly always determines symptoms of poisoning, it is better to make use of nitric acid which does not possess the same inconveniences.

There is yet a modification of this method which we owe to Brodie and Curling. These surgeons punctured the skin at a little distance from the diseased part with a very fine bistoury, in such a manner as to cause it to penetrate into the middle of the nævus, giving it the movement of an arc of a circle so as to lacerate the parts. They then replaced the bistoury with a probe moistened with a strong solution of nitrate of silver. This cauterization sufficed to arrest the hæmorrhage and to produce an inflammation which caused the obliteration of the nævus.

Various accidents may complicate the operation and the treatment, but they vary according to the mode of operation made use of. Thus, hæmorrhage is so frequently the consequence of the excision of erectile nævi that this method has been given up; inflammation and erysipelas result from ligatures, setons, and caustic injections in the openings made by acupuncture. These accidents are sometimes very serious, and of such a nature as to occasion death; but, however, they are not without remedy. There is one, however, which is little known—it is the formation of numerous abscesses in the cellular tissue, as if there had been purulent absorption. M. Mavel has twice observed this symptom consequent on the employment of the repeated strangulation of nævi. The following are the cases taken from the *Gazette des Hôpitaux:*

Case 1. *Purulent diathesis; numerous abscesses of the cellular tissue, consequent on the operation on erectile nævus by repeated strangulation.* Claudine Pegeon, six months old, stout, strong, and of good constitution, has on the top of the head an erectile nævus of the size of a large nut; a second tumour of the same nature is present on the nose, and penetrates into the right nostril. On my observing to the mother of this child that the double operation necessary to get rid of these tumours might be followed by very serious consequences, she decided on setting off to Lyons, and entered the hospital, where her child was operated on by means of caustics for the tumour of the nose, and partial and repeated strangulation for the tumour of the cranium. The strangulated tumour became detached at the end of a few days; the wound resulting was dressed with lint and simple dressing; it progressed favourably towards cicatrization, when all at once the child lost her spirits, and refused to suck; the mother then perceived that the lower limb of the right side appeared to have diminished more than an inch in length, at the same time the right buttock appeared of larger size. In this state the child was sent from the hospital and again submitted to my examination, January 26th.

The buttock has increased in size; the limb cannot be touched without causing the child to cry out; the least traction exercised on the limb restores it to its normal length and slightly diminishes the size of the buttock; no abnormal movements, no crepitation, no deviation in the direction of the limb; the same distance on both sides separates the patella from the anterior and superior spine of the ilium. On the following days the buttock had increased in size, and fluctuation was manifest; and on February 20th, by puncture with a lancet, two cupfuls of healthy pus were let out; at the same time three other tumours became developed, one below the knee and a second towards the spine of the left scapula; these two tumours contained pus like that of the buttock; a third, which was observed behind the left clavicle, gradually diminished and did not suppurate. During these numerous and serious symptoms the eschar of the nose became detached and left an erectile surface exposed, which has been three times covered by the Vienna paste. At length the suppuration of the abscesses diminished, the child gradually resumed her spirits, and her cure appeared to be complete towards the middle of April.

Claudine Pegeon is now strong and robust, and feels no effect from the numerous evils she has experienced. Her nose is of a size a little beyond the normal state, but it does not present any ugly cicatrix from the numerous cauterizations it has undergone.

Case 2. *Purulent diathesis; numerous abscesses following ligature of a nævus.* Antoinette Darsy, two months and a half old, was brought to me October 24th, 1844. On the day of her birth the midwife remarked in front of the neck a red spot one third of an inch in diameter, without increase of size. In fifteen days only the mother of the child observed, in the place of this spot, a tumour become developed which now, from above downwards, is two inches in length and more than an inch in breadth. This tumour is flattened; its centre corresponds to the upper part of the sternum. In its superior extremity it is of a red raspberry colour, and is only covered by a membrane which is almost mucous, of an extreme thinness; the inferior extremity appears to be formed of large varicose veins.

I diagnosed a fungus hæmatodes, and, seeing the rapid growth of the tumour, I operated on it next day by multiplied strangulation. Four double threads placed at the base of the tumour, one third of an inch apart, allowed me to effect five strangulations; the threads were tightened each day, and the tumour became detached of itself in the night of the 30th to the 31st. The wound, which presented a good appearance, was dressed with simple dressing and lint.

November 3rd. The suppuration has diminished. The child has lost her gaiety. I dress the wound with a stimulating ointment.

4th. Redness and swelling observed at the upper part of the right leg. I then recal the case of Claudine Pegeon, and I diagnose a deeply-seated abscess. Poultices.

6th. Fluctuation is manifest. An incision lets out a large quantity of pus; I become certain that the tibia is denuded to a considerable extent.

After a month of careful attention this abscess healed up; but a second appeared a little lower down on the same limb, which was cured like the first.

The limb is now bent in a rather remarkable manner, and one would say, on inspection, that the deformity is the result of a fracture united at an acute angle.

If, however, I compare these accidents with the easy but more prolonged cure of these same tumours by the Vienna paste, I think that this last ought to be employed in preference as often as the slight depth of the tumour will allow its easy application.

Similar accidents are rare, but the means of avoiding all of them is to employ vaccination and the Vienna caustic. I am not aware at present of the case of

a nævus treated by vaccinal inoculation in which we have had to deplore a fatal result. As to the Vienna paste, it seldom gives rise to any primary or consecutive accident, and it is on this account that I here recommend its use.

[Extirpation of nævi is only practicable when they are of the cutaneous variety, or when they can be lifted up from the parts beneath, so that their whole extent can be ascertained. If the knife is used, two elliptical incisions should be made, so as to include the whole of the diseased growth, as well as a little of the surrounding sound tissues; the diseased part should not be cut *into*, for several cases are on record of children dying from the resulting, alarming, and uncontrolable hæmorrhage.

South (*Translation of Chelius;* vol. ii, p. 283) prefers Brodie's method with the two needles, as thereby the whole base of the swelling is more completely included within the thread, and relates a case of its successful application in a child, twelve months old, who had taleangiectasies on the temple and ear. Fergusson has devised a knot of which there is a representation in *Druit's Surgeon's Vade Mecum*. A needle armed with a double thread is thrust transversely under the centre of the tumour. The centre of the thread, which has the needle in it, is then divided. Next, one end of the thread is passed through the eye of a needle, which eye should be near its point, and having been brought one fourth round the circumference of the tumour is thrust transversely through its base. Then it is to be disengaged from the eye of the needle, and the other end to be put into the eye, and to be carried back with it. Lastly, the adjoining ends of the two threads are to be tied tightly, so that each of the two threads shall include an 8-shaped portion of the tumour. The tumour may be punctured before the threads are finally tightened, but in every case the constriction should be made as tight as possible. After two or three days the ligatures should be tightened, or fresh ones should be applied. If the skin is not implicated, it may be dissected back in flaps before the ligatures are passed; or the process may be expedited, and pain be saved, by just cutting through the cutis vera, and sinking the ligatures in the cuts; so that the painful process of ulceration through the skin may be avoided. Cæsar Hawkins (*Medical Gazette*, N.S.; vol. iv, p. 940) states that the granulations after an operation often look large and prominent, as if the disease would return, but heal up readily. Curling *(London Medical Gazette)* relates a case of extensive nævus of the upper extremity in a child spontaneously cured by sloughing.

I have seen vaccination succeed in some cases, but in others it was unsuccessful, and it became necessary to destroy the nævus with Vienna paste. Dr. Gregory, from the frequent failure of vaccination, ceased to treat any in this manner. I have seen nitric acid succeed in a subcutaneous nævus of the finger which bled repeatedly at regular intervals.

Patterson (*London and Edinburgh Monthly Journal;* 1842; p. 552) cured a case of taleangiectasy of the size of a pigeon's egg, on the shoulder of an infant eleven months old, by passing needles, made red hot with a spirit lamp, in rapid succession, about twenty times, into the tumour in all directions. There was no hæmorrhage, and the child apparently suffered little pain.

The acid nitrate of mercury has been employed for the destruction of these morbid growths, and symptoms of poisoning have followed its use.

Tyrrell injected nævi with a strong solution of alum, first making a puncture with a lancet, and then inserting an Anel's syringe. I once saw this method applied in the case of large nævus over the sternum: extensive inflammation was the consequence, and the life of the child placed in some danger; the breathing

became exceedingly rapid, not from internal inflammation, but from the pain of the external inflammation, impeding the due dilatation of the thorax; the nævus was perfectly cured.

The electric cautery may be used in the case of extraordinary positions of nævi, as on the lip, in the substance of the nostril or the ear.

In some cases the only remedy is tying the principal trunk of the arteries with which the swelling is connected. Mott, in a child three years old, obtained only an imperfect result from tying the carotid artery, and subsequently tied the carotid on the other side. Möller (*Jaeger Handwörterbuch;* vol. i, p. 497), in a child four years old, tied both carotids with success. In a case of aneurism by anastomosis of the orbit causing prominence of the eye, Hayes Walton tied the carotid with decided success.—P.H.B.]

APHORISMS.

318. There are two kinds of nævi: pigmentary nævi and erectile nævi. They result from the changes produced by the accumulation of pigment, and the more or less considerable increase in the number and size of the capillaries of the skin, transformed into a spongy erectile mass.

319. The pigmentary nævi never disappear; the erectile nævi almost always remain.

320. If the erectile nævus increases too quickly, and threatens to burst, we should destroy it entirely or transform it into a tissue which is not susceptible of vascular degeneration.

321. Nævi become transformed into fibro-cellular tissue under the influence of vaccination, of the inoculation of the tartar emetic, of acupuncture, followed by caustic injections. They disappear for ever when they are energetically treated by a caustic such as the Vienna paste.

BOOK XVIII.

ON SCLEREMA, OR THE INDURATION OF THE SKIN OF INFANTS.

Sclerema is a disease characterized by induration of the skin and of the subcutaneous cellulo-adipose layer, with or without œdema of this tissue.

It is a peculiar disease, which is caused by a disturbance of the circulation of the skin and by the suspension of the capillary circulation. M. Roger has quite recently applied to it the term of algide œdema, in consequence of the extreme lowering of the temperature which accompanies it; but this denomination appears to me incorrect—1stly, because there are non-œdematous cases of sclerema; and 2ndly, because

M. Mignot has observed cases of considerable lowering of the temperature without sclerema.

It is truly impossible, after having read what authors have stated on the induration of the cellular tissue of infants, thus described under the term of *œdema* and *sclerema*, to form a precise idea of this disease.

Some state that the skin is livid; others, on the contrary, affirm that it is of a yellowish white; there are some who say that the limbs are hard, as if frozen. Others reply that this is a mistake, that the limbs are soft, and that they preserve on the surface the impression from pressure of the fingers. Here, they tell us that it is a local disease; there, that it is a general disease; in fact, there is not a single point of the history of this disease which has not been thus the subject of controversy. After the study of the works of Andry, Auvity, Underwood, Gardien, Billard, Dugès, and M. Valleix, it results that it is impossible to find out what sclerema or the œdema of the cellular tissue of infants really is.

However, if I may decide from my own observation, preference is to be given to the work of Billard; I have there found the most clear, the most correct, and the most intelligent description of this disease.

There are two varieties of sclerema; the one characterized by the induration of the skin and of the adipose tissue, this is *simple sclerema;* the other characterized by induration accompanied by œdema of the subcutaneous cellular tissue, this is what I term *œdematous sclerema.*

The skin, contracted, hard, and cold, appears no longer to exercise its functions, and to refuse passage to the blood in its capillaries, whence an obstacle to the general circulation results, which determines anasarca to a greater or less extent.

The serous infiltration of sclerema is, then, of the same nature as that of ordinary anasarca. The cause of the effusion of the liquid out of the vessels is the result of an obstacle offered to the circulation of the blood in the tissues. The œdema is thus purely symptomatic of the sclerema; it resembles that which sometimes succeeds diseases of the heart, the obliteration of the principal vessels of a limb, and that of *erysipelas of infants;* it is evidently the result of the disturbance of the capillary circulation and of the functions of the skin.

In the description of sclerema, œdema of the integuments should not be put in the first rank, as this is, in fact, only one of the more secondary symptoms, and one which is not constant. It is even sometimes wanting, just as it is observed to be wanting in certain diseases of the heart and of the organs of circulation.

The affection of the skin, whatever its nature may be, is here the principal disease; whether it is the result of the disturbance of the capillary circulation or of the perspiratory functions of the skin, little concerns us at present; it is this which is the cause of all the

symptoms, it is this which constitutes sclerema, and to it we should principally direct our attention. We shall afterwards assign in the symptoms the place which the œdema should occupy.

Now that we have precisely defined what we would understand by this term, *sclerema of infants*, we shall describe the causes, anatomical changes, symptoms, progress, and treatment of this disease.

Causes.

Sclerema is especially met with amongst the children of the poor, and amongst foundlings. It is seldom observed in the children of the middle and upper classes of society.

It appears that its development is very much favoured by the action of cold. Most authors agree in mentioning this influence, and state that cold interrupts the insensible transpiration, lowers the circulation, and condenses the mucous and serous fluids in the tissues. This may be so; but here is a table from Billard, which demonstrates that the disease develops itself at all periods of the year; however, we may have cold weather in every season.

In 1826, out of one hundred and seventy-seven children with sclerema, observed at the infirmary of the Enfants Trouvés, the number is thus divided for each month:

January	15	Brought forward	89
February	15	July	9
March	16	August	14
April	18	September	10
May	22	October	16
June	3	November	29
		December	15
	89		177

As will be observed, there are about twice the number more children attacked in cold and damp seasons; but we also find examples of this disease in the hottest months of the year.

Sclerema is a disease which should be considered as peculiar to the newly-born; however, it is also met with in children of more advanced age and even in adults; it then presents itself under a different form and with a much less degree of intensity. The induration is purely local; it is difficult to discover its causes. I have observed three examples of it, one at the Hôtel Dieu, under the care of M. Caillard, the other while dresser there, and the last was for a long time under the observation of the pupils, in the practice of M. Trousseau, at the Necker Hospital: it was the case of a young girl who had the skin of the whole of the left side of the face, neck, and chest hardened, firm as wax, white and cold like marble. The health was otherwise very good. Every one might have seen at the

Hôtel Dieu, in the practice of M. Récamier, a fourth example of the same nature, with the details of which I am unacquainted, and which was to be found at this hospital when M. Trousseau attended the practice there. Lastly, MM. Thirial, Forget, Gintrac, and Ravel, have observed other examples of it, which they have published under the terms of *stegnosis*, *chorionoïtis*, *sclerodermia*, *&c.*

These few words suffice to illustrate the comparison which may be established between certain partial indurations of the skin in adults and the induration of the newly-born. The nature of the disease appears to me to be identical. We leave to other observers the care of verifying and of defending this hypothesis.

Anatomical Alterations.

The induration of the cellular tissue of infants is local or general. It is sometimes confined to the inferior limbs, superior limbs, or face; it is often extended over the whole surface of the body.

The skin is reddish, or on the contrary without colour, of a yellowish white, according to circumstances with which we are unacquainted. It sometimes presents a very decided yellow jaundice-like tint; it does not appear to be changed in its structure; its thickness is the same as in the ordinary state, only it is very compact, very hard, and with difficulty preserves the impression of pressure of the fingers; it gives to the touch the sensation that a portion of wax or the skin of a dead subject would do. We may here observe that this alteration is not a cadaveric effect, for it is observed on living subjects, not only towards the close, but also in the course of the disease.

The layer of cellular tissue immediately beneath the skin is also indurated and forms distinct and somewhat hard adipose granulations, similar to the granulations of the adipose tissue of infants who have died from every other disease. Beneath this layer of cellular tissue is found another, the meashes of which retain a more or less considerable quantity of semi-transparent serosity, which partly oozes out at the time of section. A similar liquid is enclosed in the cellular tissue of the interstices of the muscles.

M. Chevreul, in the analysis which he has made of this liquid, has discovered that it contains a plastic matter, spontaneously coagulable on contact with air; and M. Breschet, who directed these experiments, at one time thought he had established a connection between this alteration and the disease we are now considering. Billard, naturally astonished by this extraordinary proposition, repeated the experiment; he placed in a capsule the serosity of the cellular tissue of a child with sclerema, and he observed it become jelly-like at the end of some minutes. This result required a contra-proof; an experiment was made on the serosity of a child attacked with

ordinary anasarca, the result was the same. It then became evident that the cause of the induration of the skin should be sought elsewhere than in the plasticity of the infiltrated liquid, so readily coagulable when exposed to the air.

Similar facts, however, deserve to be attentively studied. I am persuaded that Billard omitted no precautions that could prevent him committing an error; still, however, he may be mistaken.

In fact, like him, I have collected in a capsule the serosity of a child labouring under anasarca, and I have not observed it coagulate spontaneously at all. This isolated experiment proves nothing against the results put forward by the above-mentioned author; but it raises doubts in the mind with regard to them, which fresh experiments alone can dissipate. It is, in fact, a matter of much importance to confirm these researches of Billard, or to disprove them, if they are not correct, so as to return to the previous observations of M. Breschet, which may be very useful in elucidating the nature of the disease of which we are now treating.

The *principal* vessels, both arterial and venous, of the diseased parts, are perfectly permeable to the blood; they are inordinately distended by this liquid, so that there is considerable congestion of all the tissues. But the same is not the case with the *cutaneous capillaries*, which the blood appears to have in great measure abandoned, and which, for the most part, appear obliterated.

I say, appear obliterated; and the reserve which it is necessary to entertain in putting forth a similar assertion may be readily conceived. It is a difficult matter to assure ourselves of the truth, and besides, I have but once had the opportunity of making the experiment; the following are the circumstances: A child died of sclerema under the care of M. Trousseau. The *post mortem* examination was made. I put aside one of the legs in order to study the condition of the vessels by injecting into their interior a mixture of Venice turpentine and spirits of turpentine coloured by vermilion. In all the children, this liquid injected by the arteries, passed into all the superficial and deep capillaries, completely coloured the skin, the muscles, and returned by the veins. In the limb of this little patient, the injection also returned by the veins, but not at all freely. Instead of passing through all the capillaries, it only traversed a small number of the capillaries of the skin, of the subjacent cellular tissue, and it penetrated into the whole of the deep capillaries, so as to colour all the muscles.

In this case, a part of the superficial capillaries of the skin were then obliterated, since there were only a small number of these vessels which could give passage to the injection. During life, the blood traversed the skin in a very incomplete manner, whence a real

obstacle to the general and local circulation, just as is observed in erysipelas complicated with œdema. Would it be the same in all cases of simple or œdematous sclerema, and would that constitute the cause of the disease? I know not; but it may be believed if fresh experiments give a similar result to that which I have just related.

The heart presents changes to which some would refer a great influence in the production of the œdema. These changes are foreign to its development. Thus, the patency of the foramen ovale, on which so much has been insisted, is not a constant phenomenon of this disease. The obliteration exists at most only in half of the children who are affected by it, and, on the other hand, it is observed in children who have not had sclerema.

The ductus arteriosus is scarcely ever obliterated; but it is already so much narrowed so as only to give passage to a very small quantity of blood. The cavities of the heart and of the vessels are filled with this liquid, which is black and not coagulated.

The lungs present considerable alterations, which are, in my opinion, rather the result than the cause of the disease. They are gorged with blood, and here and there contain patches of lobar pneumonia. In some patients, very confluent lobular pneumonia is observed. In some, however, the respiratory organs present no change at all. This is sufficient, as Billard observes, to convince one of the slight influence exercised by pulmonary congestion and pneumonia over the œdema of infants.

As I have already mentioned, icterus is a rather frequent complication of the disease we are now considering. It is met with in one half of the children. It is not allied to a very evident alteration of the liver, which is gorged with blood, rather friable and sometimes softened, modifications which exist in a great number of other diseases not accompanied by icterus or by induration of the cellular tissue.

The alterations of the alimentary canal are rather numerous. A physician had the idea that he could establish that a vice of the conformation of the intestine was the cause of the œdema. M. Léger found the intestinal tube of less length in the children he examined than in other children. Fresh observations have reduced to nought the value of these researches.

Entero-colitis is rather frequent in the course of the disease now under consideration; but the relation which unites these two diseases remains to be established. There was a time when all diseases were considered subordinate to alterations of the intestine, and this was termed *entéro-cellulaire*, because it was regarded as the result of inflammation of the intestine. But really it is nothing of the sort. The alliance of these two diseases is merely the result of a coincidence; there is no relation of causality between them.

Such are the anatomical alterations of the œdema of infants and of the complications of this disease.

Symptoms.

There are two varieties of sclerema in infants; the one with œdema, the other without it. It is, I think, this circumstance which has led authors into the error, and which has induced them to describe separately the œdema and the induration of infants. This was not at all necessary; we do not make two categories of diseases of the heart according to the existence or non-existence of the serous effusion. This would be quite as useless in the disease now under consideration.

Children attacked with sclerema, whose skin is cold and the cellular tissue indurated, are generally very young; their age varies between one and twelve days; some appear to be born with this disease.—(Billard.)

In these children the skin yet presents the red colour of the newly-born which have not had the time to whiten. In subjects of more advanced age, it is of a dull paleness, yellowish, like wax which has been for some time exposed to the air. The epidermis is not detached or has only commenced to peel off. In others this exfoliation has completely terminated.

The induration of the skin which characterizes sclerema is a phenomenon easily appreciated and manifests itself from the commencement of the disease, and sometimes after two or three days of fever. It appears on the feet, the hands, the limbs, the pubic region, the back, the face, and, lastly, on the entire surface of the body. It sometimes is only observed on the feet and hands. It is often met with limited to a portion of the body; this is what Billard has expressed in stating that it was very common to observe local induration. The skin is hard, is with difficulty pinched, preserves more or less deeply the impression of the pressure of the fingers, according to the quantity of the liquid effused into the cellular tissue. When the infiltration is in small quantity, the hardness of the skin is much more considerable, and resembles the induration of the skin of a frozen corpse.

The portions of indurated skin are cold; and when the disease is general, this phenomonon is still much more apparent. The mouth is also cold. The hand that touches the bodies of these children experiences a very disagreeable sensation. It is difficult to warm them notwithstanding the most assiduous attention, and even at the last stage of the disease we cannot succeed in doing so at all.

Quite recently M. Roger, who has published some very curious researches on the temperature of the body in diseases of children, has directed his attention in a more special manner to the temperature of

sclerema, a disease which he has termed *algide œdema*. My learned colleague has always observed, in these cases, the thermometer descend below 91½° Fah., and in exceptional cases to fall to 70°, 73°, 72°, and even 71½°. As M. Roger very correctly observes, the loss of caloric continues incessantly in these little patients; one might say inanimate bodies submitted to the laws of inert matter.

The œdema does not exist in all children. It is not very apparent at first, and remains thus during the whole course, and even to an advanced stage of the decease. It is then that it sometimes becomes considerable.

The parts are swollen, but without being enormously distended; they are never transparent. The skin is not thinned; it remains, on the contrary, rather thick, mobile, and hard, like wax. The finger scarcely leaves an impression on the surface. In order for this impression to be deep it is necessary that there should be considerable œdema.

As is observed, the anasarca which follows induration of the cellular tissue of infants is very different from the anasarca which sometimes comes on as a consequence of erysipelas in infants, of scarlet fever, of chronic diseases, of intermittent fever, &c., and which is characterized by the enormous distention of the parts, their transparence, and the attenuation of the skin, which for a long time preserves the impression of pressure of the fingers.

This difference is undoubtedly the result of the plasticity of the liquid, which is, according to the experiments of M. Breschet, greater in the disease we are now considering than in cases of ordinary anasarca; it is also undoubtedly affected by the thickness and hardness of the external skin.

The œdema is here the consequence of the disease; it is the result of the mechanical obstacle offered to the functions of the skin and to the circulation of the cutaneous or pulmonary capillaries. On this account it resembles, in a distant manner, the œdema of diseases of the heart and large vessels.

The children preserve the faculty of motion; they still move their arms and legs rather freely. Occasionally they have convulsive movements and slight twitchings in the hands. In some subjects general stiffness in the trunk and head are observed; Dugès was able to take children beneath the head and raise them as if they were of a single piece. I have seen one which presented this phenomenon, but it was only at the last day of existence. It had no cerebral disease.

When the induration of the skin invades the face, the patients experience great difficulty in opening the mouth and moving their lips; they can neither drink nor suck, for the movements of the muscles of the jaw are very much impeded and almost entirely

destroyed. The nipple or finger may be introduced into the mouth, but they scarcely make any effort to seize it.

The cutaneous sensibility is preserved in the whole surface of the body, and the child gives perfect evidence of the sensations of pain to which he is submitted.

Children appear to suffer much from this disease. They utter singular cries, the tone and character of which have been noticed by all authors. We have already attended to these cries in one of our first chapters devoted to the physiognomy of children, by stating that the sharp, isolated, feeble, and very frequent cry of œdema was important to pay particular attention to, on account of its similarity with another cry, also acute and isolated, that of diseases of the brain, the hydrocephalic cry. This last is distinguished from the above by its being infinitely stronger, and repeated much more rarely than the other. However, I doubt if one could judge of their difference from this slight description. It is however sufficiently decided, that a person who has heard both of these cries knows how to distinguish them in every case.

The mouth of the children is cool; the tongue is red, dry; deglutition of liquids is difficult and vomitings are rare.

The abdomen is soft and appears indolent; it is thrown into irregular movements which are under the dependence of the disturbances of the respiration we have alluded to. The stools are almost absent; they are sometimes increased in number, when the induration of the skin coincides with simple irritation of the bowels or entero-colitis, which is of rather rare occurrence.

Cough is scarcely ever met with at the commencement of the disease, but it soon makes its appearance. It then continues until the termination of the affection. It depends upon pulmonary congestion and sometimes on pneumonia, alterations which exist in one third of the patients according to the observations of Billard, and in one fifth according to those of M. Valleix.

Then auscultation reveals the characteristic bruits of these morbid states, and we recognize by inspection the external and characteristic disturbances of the respiratory movements in pneumonia. The respiration is feeble, incomplete, sometimes very slow; it is usually very rapid, and presents in some patients the character of groaning expiration, *expiratory respiration*, which is observed in the inflammation of the lungs.

The circulation is always violently disturbed in the induration of the newly-born. It is impossible to appreciate the pulsations of the heart, in consequence of the cries and respiration of the children, and the number of the beatings of the pulse can only be counted with the greatest difficulty, by reason of its feebleness and of the movements

of the patient's fingers. The pulse is always very feeble and usually slow. It is on the contrary very much accelerated in certain complications, as pneumonia for example.

Progress and Complications.

The most frequent complication observed in children with sclerema betrays itself externally by a peculiar colour of the skin, due to the passage into the blood of the colouring matter of the bile; I refer to jaundice. This phenomenon is met with in a great number of patients, and especially in those who present the variety of induration without œdema, or at least with not very decided œdema. It is in relation with a slight hypertrophy, accompanied with congestion of the liver.

Pulmonary congestion and confluent lobular pneumonia are very common complications. They have been previously referred to.

In the course of the sclerema of infants, irritation of the bowels and entero-colitis are also sometimes observed; but we must not fall into error; these complications are much more rare than is stated by M. Denis, who is probably mistaken in his appreciation of the anatomical characters of inflammation of the intestine and who has undoubtedly accepted slight congestions for unequivocal traces of inflammation. What would lead to this belief is, that he wrote at a time when intestinal pathology predominated, and that now we no longer see what he observed.

This disease commences by disturbances, the nature of which it is difficult to appreciate and which are evidenced by the cries of the children. Twelve or twenty-four hours afterwards, the limbs become hard, then the face, afterwards the trunk; the child refuses to suck, it is restless, and incessantly utters the acute and feeble cry to which we have referred. The œdema commences to show itself on the second day, and it increases in a very variable manner, according to the subjects, so that there are, as we have already stated, cases of induration of the skin without œdema, or with slight œdema, or lastly, with a very considerable œdema. This phenomena should be looked upon as the result of the disease of the skin.

The disease generally lasts from two to six days, and always terminates by death when the induration is of any extent. Resolution occasionally takes place, on the contrary, when the disease is less intense, but a long time elapses before it is accomplished; it requires from fifteen days to a month to effect it.

Diagnosis.

An attempt has been made to distinguish true sclerema, that is to say, induration of the skin, *a special disease*, with or without

œdema, from the adipose induration which sometimes comes on at the last day or in the last hours of departing life, of course not wishing to include cadaveric adipose induration.

But there exists a very great difference between a phenomenon which develops itself without precursory symptoms, which is the cause of others, such as œdema, icterus, pneumonia, &c., and another phenomenon which is observed at the termination of a great number of diseases of young children at the moment of their death. It is not possible to confound these two states; one is primary and of itself constitutes a disease which may last some time; the other is secondary and forms one of the precursory symptoms of death.

Conclusions.

To resume, then, sclerema is a disease of the skin in which an obstacle is presented to the cutaneous circulation in the red and white capillaries of Bichat.

Thence a disposition to œdema results as in diseases of the large vessels. The induration of the skin, the consequence of the disturbance of the capillary circulation, constitutes the first phenomenon of the disease; serous infiltration constitutes the second.

This disease is either partial or general.

It is very serious when it is general, and it may be cured when it is partial.

It is often accompanied by icterus or pneumonia.

It is a disease of infants, but it is sometimes met with in children and in adults under the form of partial induration.

Treatment.

The therapeutic means recommended for the sclerema of infants are not numerous. Bleeding has been employed rather to combat a symptom, than from the rational views which should preside over its employment. Its use has been recommended because the skin is often the seat of active congestion, the same being also the case in most of the viscera. However, there is not in this disease any febrile reaction properly so called. The pulse is slow and feeble, and the skin is always chilly.

It is infinitely preferable in my opinion, to allow oneself to be guided by the indications which the nature of the disease affords. Moreover, it is evident and this is a fact admitted by all authors, that the capillary circulation is lowered and that it is to its disturbance that the congestion of the organs must be referred.

It is consequently more rational to endeavour to reanimate the circulating functions by internal and cutaneous stimulants than to set to work to make abstractions of blood. In fact, it is found to be much

better to order irritant frictions on the skin by means of linen cloths either dry or moistened with irritant liniments. It is moreover necessary to place the children in a properly heated ward. This means is sometimes sufficient, observes M. Valleix, to cure these patients. Bags of hot sand, or of hot bran, should be placed round the children. They should be also put into simple baths, or in warm bran baths, or those of mint, melissa, canella water, &c., and especially vapour baths, which have been very often employed by M. Baron with some success.

Internally, cordial and aromatic draughts should be given, the basis of which should be principally formed, either of wine or of the stimulant liquids extracted by distillation from the plants of the natural order Labiatæ.

It is in this manner that we may hope to cure this serious disease, if it has not by its extent already compromised life from its very invasion.

[This disease, although of such frequent occurrence abroad, is apparently uncommon in this country. Dr. Willshire states that he has now only seen three cases of this rare affection, two of them fatal ones, and West speaks of its extreme rarity.

Dr. Elsaesser (*Archiv. Gén.;* N. S.; i, 531) has lately made some observations on this disease, founded upon fifty-three cases (twenty-nine males and twenty-four females) which he has met with in the hospital during the years 1828-51. Of this number, ten only were full-timed, and of the forty-three others, ten were twins. During the same period there were born in the hospital 4,468 children at full time, and 267 premature.

The disease was especially prevalent during 1849-50, when puerperal fever also prevailed; and it is oftenest met with in November and December, no case having been seen in May. In ten cases it began to manifest itself within the first twelve hours after birth; but usually it was not met with until the third and from that to the fifth day. The diminution of weight that occurred was remarkable, as was also the diminution of temperature, both generally and in the indurated parts. Whenever any improvement occurred, this rose again. Of the fifty-three cases all but four proved fatal, either from the sclerema itself or some incidental disease. Icterus was the most frequent complication, then pemphigus and erysipelas.

On incising the parts after death, a turbid fluid, resembling that of anasarca, often flows out. The adipose tissue consists of solid, fatty granules, which are easily detached, being already separated by the effused fluid. This tissue, of a deep yellow, is usually from half a line to three lines thick, and sometimes below it a gelatinous one is found. The indurated tissue is traversed by numerous veins gorged with black blood; but no lesion of the large vessels, or obliteration of capillaries, as noted by Bouchut, have been met with. The induration rarely extended below the chorion. The muscles were pale, as if infiltrated, and in those of the buttock, small apoplectic deposits have been found. The veins and sinuses of the brain were mostly filled with dark diffluent blood, and effusion was found in the ventricles or at the base. In a tenth of the cases, lobular pneumonia was present, and in a third, portions of the lungs were impermeable to air. Intestinal lesions and hyperæmia of the abdominal viscera were common, and in eight cases, peritonitis was present.

Whatever hygienic care may be lavished on the children of hospitals, these diseases are far more frequent and fatal among them than in private practice. Among the most prominent causes, vitiation of the air must be noticed, another being the influence of chill. Cold impedes the functions of the skin, leading probably to a determination to the kidneys, which are found hyperæmic, albuminuria being often present. A principal predisposing circumstance is the innate debility or incomplete development of the organism, premature children constituting four-fifths of the subjects. On the other hand, vigorous children are sometimes attacked; and in premature twins one shall have the disease and the other be exempt from it. The treatment has chiefly consisted in the employment of hot, aromatic baths, and the administration of stimuli, such as musk. Dr. Elsässer has not met with the *chronic* form of the affection.—P.H.B.]

APHORISMS.

322. Sclerema results from an obstacle to the circulation in the cutaneous capillaries.

323. Sclerema is a disease peculiar to infants, it is very rarely observed in children or in adults.

324. Sclerema exists with or without œdema of the cellular tissue.

325. Sclerema is either general or partial.

326. Chilliness and induration of the skin, accompanied by considerable lowering of the temperature, announce sclerema.

327. In an infant, acute, isolated, feeble, and frequent cries, repeated every minute, indicate the existence of sclerema.

328. Towards the termination, sclerema is almost always complicated with pneumonia.

329. The sclerema of infants is usually fatal.

330. Partial sclerema is sometimes cured; general sclerema never.

331. Sclerema becomes less and less serious after the fifteenth day from birth.

BOOK XIX.

ON DISEASES OF THE NECK.

1st. On Cervical Tumours.

Young children are sometimes troubled with tumours of the neck, the origin of which is very obscure, and on the nature of which physicians and surgeons are far from being of the same opinion. There are two varieties of them—some are *acute*, others *chronic*, some are *congenital*, others *acquired* or *accidental*.

All chronic tumours of the neck in young children make slow progress, and are constituted of erectile tumours or of unilocular and multilocular cysts.

All accidental tumours of the neck generally originate in acute or chronic enlargement of the superficial or deep cervical glands. Their history is sufficiently well known, and is allied to that of inflammatory adenitis or to that of scrofulous diseases.

Congenital tumours of the neck are more rare and less known; they are composed of the erectile tumours which have been previously described under the name of *nævus*, or by cysts to which we shall briefly refer.

2ND. ON CYSTS OF THE NECK.

Cysts of the neck are observed in the newly-born or some months after birth, but, then, their origin belongs to the later term of intra-uterine existence. They are *congenital cysts* developed with more or less rapidity. Cæsar Hawkins has observed three examples of them, the first in a child three months old, another in a child of eight months, and the third in a subject one year old. Dr. Evans has seen a case at its commencement in a newly-born infant, and I have observed another in an infant twenty-one days old. There are also other instances of this disease dispersed in various writings, and collected by Berndt, Arnolt, &c., but I have been unable to collect the details, and I abstain from mentioning them.

In one of the cases related by Hawkins, three months old, the respiration was very much obstructed by the presence of the tumour, which was of very large size; it had numerous attacks of suffocation, and frequently awoke, especially to take breath.

This tumour was elastic, soft, compressible like a nævus.

The child died suffocated, and at the autopsy a tumour was found at the right side of the neck, being nearly as large as two oranges, separated by a deep fissure formed by the digastric muscle. This tumour was formed by the agglomeration of several hundreds of small cysts, of very variable size, as large as peas or as nuts, and even attaining the size of a walnut. These cysts closely united together, and semi-transparent, were filled with colourless transparent serosity, either reddish or black like venous blood. They extended below the jaw, surrounding the vessels and nerves of the neck, which they compressed, and then descended along the vertebral column, behind the pharynx and œsophagus to the sixth cervical vertebra.

Here is another case which came under the observation of Dr. Evans:

Case. Hydrocele of the neck in a newly-born child; cure. In March, 1845, I assisted a lady who was delivered of a very healthy male child. Some days afterwards I observed a relaxed and wrinkled fold of skin below the horizontal ramus of the lower jaw, at the right side of the neck, to the extent of a square inch. At the end of two or three months, a sensation of fluctuation was observed at this spot; a small round and soft tumour soon formed, without any change in

the colour of the skin, at first as large as a walnut; at a later period it had attained the size of a small orange.

August 8th, 1846. It was examined by Mr. Key, who considered that it contained liquid, that it might have some connection with the salivary gland, and that, therefore, it should not be interfered with until after dentition.

February 7th, 1847. The tumour was punctured with a grooved needle, and some drops of serum escaped. The tumour then equalled the size of the head of fœtus seven months old, and extended from the sternum to the ascending ramus of the inferior maxilla. The form of the chin was entirely effaced on this side.

March 11th. Increase of size, elasticity, insensibility to pressure. A puncture made with a small trochar gave issue to three or four ounces of a thin, yellowish, straw-coloured liquid; slight decrease in size; moderate flow for two or three days. Tincture of iodine and alterative doses of mercury and iodide of potassium.

June 6th. Assisted by Dr. Crisp, I passed a seton needle with five or six silk threads. A little aqueous matter escaped.

7th. The same liquid escapes in small quantity. There is neither fever nor inflammation.

8th. Coma for three hours in the afternoon; convulsions of three quarters of an hour's duration. On my arrival they had ceased. Fever, intense heat of the head, inflammation, and increase of the size of the cyst. The seton removed, warm bath, poultice and fomentation to the part; castor oil.

9th. Intense fever, heaviness of head, skin hot, look depressed, constipation. Calomel and saline purgative; cold applications to the head; fomentations to the neck.

10th to 13th. The state of the patient is less alarming.

14th. Sense of fluctuation. I saw the patient with Bransby Cooper, who made a puncture at the most projecting portion; a small quantity of clear pus escaped.

15th to the 21st. Very slight escape.

22nd. Bad night; infiltration of the right eyelid, diarrhœa, loss of appetite.

24th. Swelling and hardness around the temporo-maxillary articulation; the parotid appears inflamed.

28th. Considerable sero-purulent discharge from the right ear; diminution of the fever.

29th and 30th. Depression. Quinine and citrate of iron.

July 1st. Anxiety, emaciation, anorexia; considerable oozing from the meatus anditorius.

19th. Extreme susceptibility, frequent cough, purulent expectoration.

23rd. Hectic fever, excessive fever and emaciation. Quinine, beef tea, arrow-root, wine; opiate at night.

26th. Rapid diminution of the tumour.

31st. Better; appearance of large pustules over the whole body, which are immediately opened.

August 19th and 20th. The cough has ceased; the patient is carried out in the air.

30th. He begins to walk; is getting plump. The tumour has almost completely disappeared.

April 16th, 1850. Perfect health. A small portion of loose and wrinkled skin, identical with that which was observed some days after birth, is the only trace of the previous enormous tumour.

I have had the opportunity of observing one of these cysts at the Necker Hospital. It was in 1842, in a child twenty-one days old, admitted in consequence of pneumonia, which caused death.

This child had at the left side of the neck, beneath the lower jaw, a tumour of about the size of an egg, rather projecting, unequal, irregular, soft, compressible like an erectile tumour, without pain and change in the colour of the skin. No part of it appeared internally in the mouth; I did not then know the nature of the tumour, and I had not come to any conclusion when the child died. This tumour, situated at a little distance from the skin, in front of the sterno mastoid muscle, rested on the vessels and nerves of the neck, was irregularly elongated from above downwards, projecting slightly beneath the ramus of the jaw, and descended along the larynx as far as the thyroid body.

It was composed of serous cysts, colourless, irregular, of the size of hemp seeds or of nuts. These cysts were close together, and isolated by fragments and lamellæ of fatty cellular and fibrous tissue. They might be called a cluster of hydatids.

More recently in 1851, I have observed a very similar case presented by M. Morel to the Society of Biology; and this physician has informed me that he has seen another instance in which the cyst was formed of a single pouch divided internally by tendinous bands.

The cysts of the neck are then *unilocular* or *multilocular*, and appear to be formed of fibro-cellular or fibrous walls, filled with serosity which is either colourless or reddened by the colouring matter of the blood.

These cysts increase daily in number and size, and cause symptoms which are due to compression of the vessels and of the nerves of the cervical region. They obstruct the circulation in the neck, the movements of the head, the nervous current, the passage of air into the larynx, and may occasion asphyxia by suffocation.

They should be treated by surgical means, either by *acupuncture*, as Hawkins recommends, or by slender setons composed of rather numerous lengths of silk, as Dr. Evans has done.

Acupuncture does not cause any bad symptoms, and should be combined with iodine frictions over the tumour, or with compression when this is possible.

Setons may determine a rather extensive suppuration accompanied by fever and severe general symptoms. Poultices should then be applied over the tumours and frictions with mercurial ointment repeated several times a day. This is the best method of treating these symptoms.

[Professor Mütter (*Philadelphia Medical Examiner;* vol. vii, p. 257), relates four cases of what he terms hydrocele of the neck, and subjoins a short account of its symptoms and treatment. The first case was a congenital one, and consisted of numerous sacs not having intercommunication, some of which reached a very large size, and encircling the throat and chin, embarrassed the respiration. When they did so to a great extent, one of them was punctured with great relief, and that on two or three occasions. The child, however, died from œdema of the glottis, probably brought on by the compression of the distended sacs, which were found to be both large and numerous. The three others were acquired, and were all, as is the case with the bulk of recorded instances, situated on the *left* side. In one in which a radical treatment was opposed, forty-four ounces of a chocolate-coloured fluid were drawn off, and several months elapsed before

reaccumulation. In another case a seton was introduced, which produced no bad symptom, and was followed by a radical cure. In the last case this was obtained by dissecting out the cyst, which was only the size of a walnut.

Speaking of treatment, Dr. Mütter observes that the operation of *excision* should be confined to cases in which the tumour is small, circumscribed, and superficial, and when a small scar is not considered of importance, under which circumstances it is the preferable plan. *Repeated tappings*, care being taken to empty the sac of all fluid lest it infiltrate into the cellular tissue, may be employed as a palliative in congenital hydrocele of the neck, when severe measures might be undesirable and may sometimes effect a radical cure by keeping the sac constantly empty. In old cases it may be resorted to relieve urgent symptoms, or when the patient will not submit to other means. The chance of a radical cure is increased by scratching the interior of the sac with the trocar before withdrawing it ; and after the operation, moderate pressure should be kept up over the sac. The shortest plan of curing one of these tumours, if superficial, is *free incision of the sac*, following it by moderate compression ; but the long and unsightly scar it leaves would be with many an insuperable objection. In order to convert the surface into a granulating one, several surgeons have combined with incision the *application of stimulating substances to the sac*, as lint, iodine, wine, &c. This, however, excites great inflammation, is followed by a large irregular cicatrix, and requires much time. *Injections* have been abandoned on account of the inefficiency of weak and the danger of strong ones, but it would appear that iodine injections are suitable, and indeed have been used with success in this affection. The seton is the best means for cases in which extirpation, repeated tapping, or incision are inappropriate or have failed. No means is so promising when the disease is unilocular and of long standing. The treatment occupies several weeks perhaps, but the method is safe, easy, slightly painful, certain, and followed by scarcely any scar.—P.H.B.]

BOOK XX.

ON DISEASES OF THE EYE.

ON THE PURULENT OPHTHALMIA OF INFANTS.

The term *purulent ophthalmia* is applied to a specific inflammation of the ocular and palpebral conjunctiva, often united with inflammation of the cornea.

In this disease, the eyelids are red and considerably swollen; the conjunctiva secretes an abundant quantity of pus, and the eye is often compromised or ultimately lost.

Purulent ophthalmia is developed in infants at the third or fourth day after birth, in those whose mothers have habitually fluor albus or are affected with syphilitic blennorrhagia, and lastly, in those who are born at the time of epidemics of puerperal fever. Purulent ophthalmia is more frequent in this last circumstance than in ordinary circumstances.

It is also developed in children at the breast placed in unfavourable hygienic conditions, and particularly in children who are brought to the "Enfants Trouvés," or to hospitals devoted to children. It is then often observed in an epidemic manner, and it seizes upon a great number of children at a time.

This disease is often contagious; it is therefore proper to wash the hands after having touched the eyelids of a child labouring under it. This measure is dictated by prudence, for it is impossible to distinguish inflammatory purulent ophthalmia from blennorrhagic ophthalmia. Besides this is evidently contagious and transmissible by direct contact. The necessary precautions should be then taken in respect to both of them, so as not to contract the disease ourselves or to communicate it to other children.

Purulent ophthalmia is one of those diseases which should be early recognized; for it is so quick in its progress, so destructive in the rapid and serious lesions that it causes in the organs of vision, that if we delay the necessary remedies for its treatment, it becomes impossible to treat it successfully. The disease is cured, but the eyes are lost.

At the beginning, the eyelids are a little reddened and slightly swollen. At first only a single red transverse line occupying the centre of the eyelid is observed; but soon the edges and the internal angle of the eye become red and painful on pressure. The action of

light is painful, and a constant pain exists which causes the children to cry and deprives them of sleep. The conjunctiva is generally injected. The eye does not present any change.

These alterations rapidly assume much intensity. In the space of twelve or twenty-four hours, the redness of the eyelids becomes so general and their swelling so considerable, that the eyes can no longer open. The upper eyelid overlaps the lower one; they become agglutinated together by dry pus, and when they are separated from each other, a creamy, whitish, thick matter, of purulent appearance, escapes and flows out externally. The ocular and palpebral conjunctiva is very red, much swollen, and covered with very numerous minute granulations.

The eye as yet presents no alteration. The cornea has not losts its transparency.

The puriform secretion quickly changes its colour; it is very abundant, greenish, and sometimes mixed with blood. It is then that inflammation of the cornea, its softening, ulceration, perforation, and frequently loss of the eye, are observed.

It is often difficult to appreciate in a satisfactory manner the progress of these changes, for we cannot sufficiently separate the eyelids without forcibly pressing against the child, and this manœuvre causes horrible suffering. However, we may take advantage of the moment in which a collyrium is introduced into the eye to examine the surface of this organ.

We then observe that the cornea has lost its brilliancy and polish, and that it presents one or two specks of a greyish tint, differing from the colour of the neighbouring parts. This grey tint belongs to the portion of the cornea which is softened. The centre of this softening soon becomes perforated, the humours of the eye escape, and the eye empties itself, unless as is sometimes met with, hernia of the iris takes place which obliterates the opening and opposes the escape of the vitreous humour. In either case we may regard the eye as lost for the purposes of vision.

We moreover observe on the cornea an ulceration of greater or less depth, with or without softening of the neighbouring parts. When the ulceration is large, it may cause symptoms similar to those which the preceding alteration has produced, that is to say, the loss of the eye.

Lastly, in some children there is only purulent infiltration of the cornea, which is opaque to a more or less considerable extent. This infiltration and the cicatrix of the ulcers of the cornea are the origin of those specks which are observed after the cure of purulent ophthalmia.

As soon as the inflammation is lessened, the swelling and redness of the eyelids diminish; suppuration is less abundant, less thick, and assumes an improved appearance. The child supports the light better and opens the eyelids with more facility. We can now see whether the eye is much damaged; then we observe the opacity and staphyloma

of the cornea, deformity of the pupil, consequent upon abnormal adhesions of the iris; and, lastly, emptiness of the globe of the eye.

Such are the symptoms of purulent ophthalmia; they are, as will be observed, very serious; sometimes they scarcely last a few days, and the disease terminates favourably. But when they last a longer time, it is seldom that the globe of the eye has not been atacked; then they persist for several weeks and even for several months.

Amongst the changes in the eye which succeed purulent ophthalmia, there is one which is less serious than we might be led to expect. The opacity of the cornea, which results from the ulceration or from the softening of this part, terminates by disappearing in process of time. For this, it is necessary that it should not be general, and that it should not invade all the layers of the cornea. We observe rather frequently in young children—and this observation is well known—we observe, I say, the very evident but superficial opacity of the cornea disappear completely, or only leave imperceptible traces behind. This disappearance is always slow, and it requires several months and even several years to accomplish it. I have seen it brought about in some weeks, but these cases are very exceptional. We should take care to do nothing with the intention of hastening its flight, under pain of occasioning fresh symptoms which might have quite a contrary result to that which we wished to obtain.

Purulent ophthalmia should be promptly treated from its commencement by the most energetic means. Some have recommended the application of one or two leeches to the temples, but this abstraction of blood is not always followed by great amelioration. Moreover, as in this case there is little time to be lost, we should make use of those means which most constantly succeed; compresses moistened with astringent liquids, and particularly with alum solution, should be applied to the eyelids. In addition we should instil twice a day beneath the eyelids, by means of a syringe, or, still better, by means of a camel's-hair brush, a solution of nitrate of silver, of which the following is the formula:

Nitrate of silver	iv grains.
Distilled water	℥ j.

Dissolve, and keep from the action of the light.

These proportions are not indifferent; for if we are to modify the inflammation of the conjunctiva by means of this excitant, it is equally necessary not to exceed the object we would obtain. So that, if we employ a more concentrated solution, we might, instead of advantageously modifying the inflammation, give it a fresh activity and thus hasten the loss of the eye.

In some cases the palpebral conjunctiva, and even the cornea, should be slightly touched with a stick of nitrate of silver. This cauterization

should be applied to the conjunctiva when it is very much swollen and covered with the minute granulations we have mentioned. Ulcerations of the cornea should be cauterized when they can be easily and perfectly viewed.

These various means are the best we can put in force and the only ones which we should employ. Compresses moistened with cold water and with liquid astringents, collyria of the sulphate of copper, of the sulphate of zinc, &c., are also made use of; but there is no substance which can advantageously replace the nitrate of silver.

Before finishing this chapter we ought to mention an accident which sometimes happens in the course of the treatment of purulent ophthalmia; it is less the fault of the practitioner than of the child, but we should, however, endeavour to avoid it. When the eyelids are very much swollen, and we would separate them in order to examine the eye and apply the collyrium, the child opposes, struggles, contracts the orbicular muscles and thus favours the eversion of the tarsal cartilage, which forms an ectropion of the upper eyelid. This eversion is generally of no consequence; it ceases as soon as the eyelid is abandoned; but in some children it remains, and this luxation of the tarsal cartilages can only be reduced by introducing a foreign body under the eyelid, making use of the hand to replace them in their natural position. We should avoid this displacement of the edge of the cartilage so as not to have the trouble of such an operation. If the child resists when we would open the eye, we should not insist, but should be contented with slightly separating the eyelids, as much as is necessary to introduce the brush moistened with nitrate of silver below them. By not contending against the little patient we are certain of not determining this eversion, which is so difficult to reduce in some circumstances.

Purulent Ophthalmia.

[More than 600 cases from the basis of Dr. Mildner's Essay (*Annales d'Oculistique*; sér. 4, tom. ii, p. 140), and during only four months of 1844-5, 300 infants were treated for this disease in the Prague Foundling Hospital. It commenced most frequently between the sixth and ninth day, and in only seven out of 300 cases was it confined to one eye. The mean duration of the disease was twenty-nine days. Of the 300 cases, 111 had ulcerations of the cornea, but in sixty-two these were not sufficiently serious to interfere much with vision. Ten children (in 300) were blinded, and thirty-seven died of various diseases. In 112 cases there was also disease of the digestive organs, in 102 jaundice, and in ninety-four pharyngeal exudations.

The *catarrhal* form of the disease may be either local or a symptom of general affection; and most of the children, in fact, manifested "an albuminous crasis of the blood," characterized by a catarrhal state of the mucous membranes, marasmus, and debility. The influence of atmospheric causes was obvious, and often when the wards were overcrowded with puerperal women, especially if the

air was moist and cold, from six to ten infants would be seized on the same day and usually in both eyes. When, too, the catarrhal affections took on a "septic" character, numerous cases of umbilical phlebitis, purulent infection, gangrenous erysipelas, croup, &c., were observed. The *croupal* form of the disease is characterized by exudations of various thickness, which may assume the membranous form with newly created vessels and is often accompanied with the development of false membranes in the mouth and pharynx. When this variety took on the septic character, loss of vision might be predicted, though but a small portion of the cornea was affected.

It is very important to decide whether the disease is merely *local* or symptomatic of a *general* affection. The former is the case when the mother is healthy and the child well nourished, the influence of an external agent recognizable, symptoms of catarrh, or exudations on the other mucous membranes, absent, and one eye alone affected, at least at first. It then rarely gives rise to large ulcerations, and causes fever only when the inflammation is intense. Its prognosis is favourable, and the influence of caustics is speedy and beneficial. When, however, the reverse of the above circumstances prevail, we should regard pyophthalmia as a very serious disease.

Of 454 children affected with pyophthalmia during 1836-9 Dr. Mildner states that twenty-nine lost their sight, and during the following years but twenty-two in 689 and ten in 300—an amelioration chiefly due to the improved hygienic conditions effected. When the disease is local and confined to the conjunctiva, especially when produced by the contact of gonorrheal or syphilitic poison, it will yield readily to the nitrate of silver (gr. one to four, to four oz. of distilled water).

Von Ammon treats the disease by a collyrium composed of three or four grains of the ext. of belladonna, six to eight drops of aqua oxymuriatica, and three or four oz. of water. After a while the proportion of water is gradually diminished. I have found cases of this disease rapidly tractable in private practice by hourly injections of alum, gr. v to ℥ j, or of nitrate of silver, from gr. ij to gr. v to ℥ j of water—but it is of the highest importance that the injections should be thoroughly and frequently applied.—P.H.B.]

Congenital Cataract.

[The early and fœtal existence is its only peculiarity: in the majority of cases Walton has seen, the capsule has been opaque and very much thickened, and contained either a small portion of the lens, or merely a milky fluid; yet, the lens only may be implicated, and in all respects just as in cataract occurring after birth. He imagines that the partial lenticular opacity occasionally met with in young persons is often of congenital origin, though it is often overlooked; especially when it is very small and remains for a while stationary; and it would seem that exceptions to the general law of the ultimate implication of the entire lens, after a part has lost its transparency, occur most frequently in partial congenital lenticular opacity.—*Operative Ophthalmic Surgery.*

Dalrymple remarks that "in those cases of congenital opacity of the lens, not unfrequently met with, in which partial vision exists for a considerable length of time, there appears to be an arrest of development at a period, varying in different cases, anterior to the birth of the infant; for if we see the patient for the first time, in youth, or early manhood, we find, on dilating the pupil, that the lens is probably not more than two-thirds its natural bulk—that in fact, a clear ring of black may be seen between the pupillary margin of the iris and the circumference of the opaque lens."

There are very great and important anatomico-pathological differences between a congenital cataract examined soon after birth, and one seen only several years later, say towards the adult period. The recent congenital cataract is capsulo-lenticular, while the older one is capsular only. Saunders first explained the mechanism by which this change is effected. The lens of the recent cataract gradually softens, and the capsule actively absorbs it, or that it disappears entirely by the seventh or eighth year. But as in general no fluid replaces the removed lens, the anterior portion of the capsule falls back, and adheres to the posterior, which, by reason of its attachment to the hyaloid membrane, undergoes no displacement. The posterior chamber of the eye becomes thus much enlarged, and the iris, in contact with the increased quantity of the aqueous humour that fills this, receives from it during the contraction of the muscles of the eye an undulatory movement, which has been designated as a tremulance of the iris. The true value of this symptom should be understood, for it has been regarded erroneously by some authors as indicating the existence of a synchysis or an amaurosis.—Tavignot, *Gazette des Hôpitaux;* No. 50.

M. Sichel, in some observations on cataract, recently drew attention to the case of a young girl in whom he had lacerated a secondary capsular cataract, as exemplifying the *hereditary* character of *congenital cataract.* Her father and uncle were both operated on, about two years since, for congenital cataract of both eyes, which had however only become complete in the thirty-third year, an interval of a year elapsing in each case before such completion and the operation in the second eye. The cousin of the girl, aged fifteen and a half, son of one of the brothers, was operated on at eighteen for a congenital cataract which had been complete at fourteen. There is one in the other eye not yet complete. In none of the ascending branches of the family had cataract manifested itself. In my attendance at the London Ophthalmic Hospital I have met with numerous instances of the hereditary character of congenital cataract.

Congenital cataract should be operated upon early—within four months if possible, lest the eye, which when born blind habitually oscillates from side to side, may never acquire the power of being directed to one particular object. The pupil being well dilated, the child tightly wrapped in a sheet, should be placed on a table—the head on a pillow, and rather hanging over it—the arms and head being fixed, and the lower eyelid depressed by assistants. The operator then seated behind the patient, elevates the upper lid and fixes the globe with an elevator and performs the operation for absorption, by introducing the needle behind the iris, freely dividing the anterior layer of the capsule, drilling a hole once or twice through the substance of the lens. Care must be taken not to dislocate the lens, and not to wound the posterior capsule or vitreous humour. The cataract will be more or less dissolved by the vitreous humour and be absorbed. After the lapse of a few weeks the operation may be repeated, the capsule may be lacerated more extensively and the lens cut into fragments; the operation may be repeated again and again if necessary—it excites so little inflammation in children that both eyes may be operated on at once.—P.H.B.]

BOOK XXI.

ON DISEASES OF THE EAR.

The ear is the seat of numerous diseases which are not all equally frequent in young children. Acute otitis, chronic otitis, and otorrhœa, are the only ones which are observed in the tender age, and even then they are very rare.

Acute otitis sometimes results from the inflammation of the buccal mucous membrane, which, by means of the Eustachian tube, invades the internal ear where it becomes fixed. It often succeeds acute diseases, particularly measles, and occasions loss of hearing, persistence of the fever, more or less acute pains, and lastly, at the end of several days, perforation of the membrane tympani and the escape of pus by the external auditory canal. The pus continues to be discharged for several days, then ceases to flow, if the inflammation terminates by resolution.

Usually the inflammation passes to the chronic state, suppuration continues and prolongs itself several weeks or some months. This transformation of the disease has received the name of otorrhœa. It is very commonly observed in weak, lymphatic scrofulous subjects, or in those born of ill-constitutioned parents, who are themselves more or less tainted with scrofula. Lastly, in some cases, suppuration of the interior of the ear alters the walls of the tympanum and extends to the mastoid cells and to the petrous portion itself in consequence of the alteration of the bones, and of their necrosis or of their consecutive caries. Then the disease becomes indefinitely prolonged, suppuration does not diminish, fragments of bone are rejected, and the disease, advancing daily, extends from the petrous portion to the dura mater, to the meninges and to the brain, whence meningitis and death result.

Amongst the cases I have collected, some are worthy of interest; the following is the summary:

1st. A child named Yver, two years old, was admitted into the Necker Hospital with acute bronchitis.

His head was of large size, like that of a hydrocephalic patient and like that of other individuals of the family.

It often had convulsions.

In consequence of measles, acute otitis, suppuration and perforation of the walls of the tympanum, prolongation of the disease.

Chronic otitis, caries of the petrous portion of the temporal bone, expulsion of very evident fragments of bone.

Intermittent hectic fever.

Death at the end of eight months, after an attack of acute meningitis.

This child was not completely deaf, and learnt fresh words every day.

2nd. Another child (Boissonnade) eighteen months old, twelve teeth, thin, weak, ill-developed, had acute otitis, afterwards chronic otitis consequent on a serious attack of bronchitis. The two ears suppurated, and at the end of a year *very porous* portions of bone escaped from the auditory canal. Intermittent hectic fever became established, and the child, becoming gradually more feeble, died of chronic enteritis, with caries of one of the petrous portions of the temporal bone.

The deafness in this child was incomplete; it retained and every day pronounced monosyllables which it could not say the day before; and at length answered questions.

Chronic otitis and otorrhœa ought to be treated internally by the iodide of potassium, cod liver oil, antiscorbutic syrup, syrup of bark, syrup of walnut leaves, and externally by mucilaginous or astringent injections. These last are much the most useful, and decoction of strawberry root, of red roses, of walnut leaves, &c., are those which should be employed.

[Inflammation of the dura mater is occasionally the result of otorrhœa. Sometimes acute inflammation arises within the tympanum, when there has been no previous disease; the patient has severe headache; at length a gush of matter comes from the external meatus, but the pain does not, as it usually does in such cases, cease; it continues, and even increases in intensity, the patient begins to shiver, he becomes dull and drowsy, slight delirium perhaps occurs, and by degrees he sinks into stupor. In some instances no pus issues externally. Similar symptoms more commonly supervene upon a *chronic* discharge of purulent matter from the ear.

The following examples illustrate the phenomena of this disease: A youth, sixteen years old, applied to the late Dr. Powell (*Transactions of the College of Physicians;* vol. v) on account of an eruption with an acrid discharge behind the right ear. He had become deaf five years before, after scarlet fever, but no discharge took place at that time from the ear. In the following year, however, he had the measles, and then an abscess formed in the right ear, and after giving him much pain it burst. He had again suffered, three days before Dr. Powell first saw him, a sudden attack of very severe pain in the same ear. The pain quite deprived him of rest; but he had no fever, nor delirium, nor coma. He slept indeed a great deal, but that was the effect of opiates which he took to relieve the pain. This symptom was quieted by the opium, but it always returned with severity if the medicine was suspended. A fœtid discharge came from the ear. On the tenth day of this attack, after a most violent paroxysm of pain, his strength rapidly declined, and he died.

"When the head was examined the structure of the dura mater was healthy and natural, but beneath this membrane the whole superior surface of the right hemisphere was covered with a layer of coagulable lymph and pus. The vessels of the substance of the brain were not more numerous or loaded than usual, and the brain itself was healthy in every part. In the base of the skull the dura mater adhered to the bone, except at one part of about half an inch diameter, just over the petrous portion of the temporal bone, where it was black and sloughy. The subjacent portion of the bone itself was carious, black, and crumbling, and contained fœtid pus.

It will be observed that in this case there was no symptom to mark the extensive mischief within the head, except the *pain;* the pulse never exceeded seventy-two,

the skin was warm and moist; there was neither fever, nor delirium, nor convulsion, nor coma.

Dr. Abercrombie *(Diseases of the Brain, &c.)* relates the case of a girl, aged nine, who had been liable to attacks of suppuration of the ear, which were usually preceded by severe pain and some fever. She suffered one of these attacks in the left ear in July, 1810. Upon the discharge of matter from the ear she did not obtain ease, as she had done on former occasions, but continued to be affected with pain, which extended over the forehead. When Dr. Abercrombie saw her he found that besides the pain she had some vomiting and impatience of light. Her look was oppressed; the pulse eighty-four. Blood letting, purging, blistering, and mercury were employed without relief. Two days afterwards there was slight and transient delirium, a degree of stupor, and slight convulsions. She lay constantly with both her hands pressed upon her forehead, and moaning from pain, of which there had not been the least alleviation. On the fifth day from the commencement of the discharge she continued sensible, and died suddenly in the afternoon without either squinting, blindness, or coma, the pulse having been always under ninety. A considerable quantity of colourless fluid was found in the ventricles of the brain, which in other respects was healthy. In the left lobe of the *cerebellum* there was an abscess of considerable extent, containing purulent matter of intolerable fœtor. The dura mater, where it covered this part of the cerebellum, was thickened and spongy, and the bone corresponding to this portion was soft and slightly carious on its inner surface; but there was no communication with the cavity of the ear.

There is also an account given of a boy, aged fourteen years, who had been affected for two months with headache and discharge of matter from the right ear. A week before his death the pain increased, and was accompanied by great debility, giddiness, and some vomiting. He continued in this state, without stupor or any other remarkable symptom, until the day of his death, when he was suddenly seized with convulsions and died. An abscess was found in the middle lobe of the right hemisphere of the brain, and another in the cerebellum, and there was extensive caries of the petrous portion of the temporal bone, with effusion of three ounces of fluid in the ventricles.—(*Op. Cit.;* p. 37.)

Watson (*Lectures on the Practice of Physic;* p. 364) relates two very remarkable instances of diffused inflammation of veins occurring in connection with purulent otorrhœa. The first was a boy, eleven years old, who had a discharge of offensive purulent matter from his ear since an attack of scarlatina four years previous. The day after sleeping on damp grass, he was attacked with headache, shivering, and fever. Strong rigors, followed by heat and perspiration, occurred very regularly for two or three days in succession, suggesting the suspicion that the complaint might be ague; but then pain and swelling of some of the joints came on, and were at first considered rheumatic. However, the true and alarming nature of the case soon became apparent. Abscesses formed in and about the affected joints, and one of these fluctuating swellings was opened, and a considerable quantity of foul, grumous, dark-coloured matter let out. About a fortnight after the child sunk under the continued irritation of the disease. The hip joint presented a frightful specimen of disorganization; it was full of unhealthy sanious pus, the ligamentum teres was destroyed, the articular cartilages were gone, and matter had burrowed extensively among the surrounding muscles. The knee and ankle joints of the same limb were in a similar state. It is curious that the destructive disease of the joints was limited to those of the right lower extremity, while the primary suppuration was in the left ear. Unfortunately the head was not examined, but doubtless the fatal disorder had penetrated from the ear to the dura mater, and in all probability the inflammation had involved the veins or sinuses of the head.

The second case was very similar to the above. A lad had pain and tumefaction of the right shoulder, wrists, and foot, with redness of the latter; he also complained of headache, vertigo, drowsiness, and of an occasional feeling of stupor; his skin was hot and dry, his face flushed, his tongue furred, his pulse frequent (112), and his bowels were relaxed; there was a puriform discharge from the right ear. The week before he had been seized with a sharp pain in that ear, which lasted twenty-four hours, when the discharge commenced and the pain was relieved. He then also began to have headache, which had never left him, and to be sometimes dizzy. Three days afterwards what was supposed to be rheumatism commenced in his right foot; the redness was circumscribed and limited to the great toe. After rigors, abscesses formed near the toe, near the shoulder, in the left hip, and in the loins, from which he gradually sunk. On the *post mortem* examination the articulations of the right shoulder joined, the left hip and the great toe were found diseased and filled with purulent matter. There was purulent infiltration of the lungs, and the mastoid cells of the right temporal bone were filled with pus.

Dr. Bruce (*Medical Gazette;* 1841) has published two cases, witnessed by himself, of "phlebitis of the cerebral sinuses as a result of purulent otorrhœa," and refers to several other instances of the same kind recorded by different authors; and Dr. Griffin has related two examples of otitis with symptoms exactly resembling those of intermittent fever.—*(Dublin Journal of Science.)*

Mr. Toynbee, at a recent meeting of the Pathological Society, showed a case of disease of the brain from caries of the petrous portion of the temporal bone after scarlet fever, the true cause of which was the confinement of the products of ulceration, on account of want of free exit for the matter. In the case exhibited, on one side the membrane tympani was completely destroyed, leaving a free opening for the escape of pus, and no caries of the bone had followed. On the other side, in the same patient, the membrane was only partially destroyed; the products of ulceration had been confined behind it, and caries had followed. There was also anchylosis of the stapes to the fenestra ovalis, and the base of the stapes was expanded and projecting.

Foreign bodies are not unfrequently met with in the ears of children, who in moments of distraction and play introduce slate pencil, small stones, peas, glass beads, &c., generally roundish and smooth substances, into the auditory passage, which, if permitted to remain, would give rise to considerable inflammation and deafness. Great gentleness and care should be exercised in the removal of these bodies, which may generally be accomplished by syringing the ear with warm water, and by seizing the foreign body by small forceps or a bent wire or probe. Bodies which by moisture become increased in size, as peas, should be immediately removed; if, however, it happens that the harder bodies cannot be removed by gentle means, they may be allowed to remain, when probably they will become coated with wax, and the passage will enlarge by interstitial absorption, so that it will come away without trouble. Pilcher relates cases in which the foreign bodies were left undisturbed for many years. Fabricius Hildanus witnessed hemicrania, debility of the entire half of the body, obstinate coughs, epilepsy, and wasting of the arm, from the circumstance of a bead having been forced into the ear. Restoration to health followed its abstraction. Sabatier saw typhus fever and death consequent upon the pressure of a pellet of paper in this situation. Power observed protracted salivation and atrophy result from a dossil of wool. Insects may be killed by a drop of oil or solution of acetate of lead, dilute cherry laurel water, or a weak solution of corrosive sublimate.—P.H.B.]

BOOK XXII.

ON DISEASES OF THE BONES.

CHAPTER I.

ON RACHITIS.

Rachitis is a general disease of the osseous system, characterized by swelling, friability, and softening of bones, whence a great number of the deformities of the skeleton result.

Some authors term it *osteoporosis*, others conjoin it with *osteomalachia*, under the same denomination. It is a disease, the knowledge of which is due to the labours of the celebrated Glisson, in 1647, and since then to the labours of Haller, Boerhaave, Van Swieten, Duverney, Portal, Boyer, Rufz, MM. J. Guerin, Sanski, and still more recently to M. Beylard, in an excellent inaugural dissertation.

I am of the opinion of Boyer and M. Beylard; rachitis and osteomalachia constitute one and the same disease of the bones, modified by the age of the subjects. I consider that rachitis is the osteomalachia of infancy.

Causes.

Rachitis is sometimes developed in the fœtus while yet in its mother's womb, even when her health does not appear changed. The museums of pathological anatomy contain several skeletons of these children rachitic from birth.

Rachitis is especially a disease of infancy, which usually makes its appearance between the third and fourth month, and which is generally produced by insufficient food, and residence in cold, damp, and badly lighted places. Thus it is particularly remarked amongst the children of the poor who are weaned early, and who are, before the proper age, placed at the family table to be fed with soups, broth, vegetables, meat, &c. These aliments are good, but they should be reserved until the fitting time. The young child should be suckled for twelve or eighteen months, and commencing at the sixteenth, thin broths and the milk of the cow may be given; with this nourishment, open air, and sunshine, he will not become rachitic.

Azotized foods should only be given to children in the course of

the second year, still it is necessary to know how to combine them with milk-food, which should form the indispensable basis of the nourishment in the first two years of existence.

Rachitis is a disease of cold and damp climates; it is especially developed in Holland, England, and the north of France. As humidity and cold very much depend upon the absence of the sun, we might also say that the disease we are now considering becomes developed in preference in those subjects who are rarely exposed to the influence of solar light.

M. Guerin has studied the etiology of rachitis to a considerable extent, and has made experiments on young dogs with the endeavour to prove that a too nourishing food, and the use of meat in particular, may bring on this disease. He has placed in a dark room, puppies one month old, and weaned; he has fed them with bread and meat pie, and at the end of two or three months they became rachitic. But here we must take into consideration the darkness and the want of exercise, circumstances which may of themselves alone bring on rachitis. In order to make these experiments conclusive, it would be necessary to institute them, on the one hand, on a series of puppies fed on meat, some running about in a park, others shut up by day, and placed in the most complete obscurity; and on the other hand, on a fresh series of animals differently fed, and placed in similar conditions as regards habitation and exercise. If experiments of this kind are not instituted, it is impossible to come to any conclusion on the subject of the real causes of the disease we are now considering.

Pathological Anatomy.

1*st. Stage.* This stage, which is that of the invasion of the disease, may be termed—*The stage of the softening of the bone.*

The bones, and especially the long bones, present a rather considerable swelling, especially in the spongy and cartilaginous parts of the extremities, whence the vulgar term of knotty *(noueure)* applied to rachitis.

The swelling is less considerable in the diaphysis; it is equally well marked in the flat bones, but for this it is necessary that the disease should be general.

When these bones are incised either transversely or longitudinally, which is very easy on account of their softening, we find all these cells filled with spongy tissue, dilated and containing a gelatinous sanguinolent, blackish liquid, which can be readily washed away with water. In the body of the bone, in the situation when the tissue of the bone is the most compact, that which is called dilatation of the cellules is nothing else than the removal of the osseous lamellæ which constitute the osseous tissue, in such a manner that the bone, in this

situation, much resembles a portion of dried rush, cut longitudinally; its tissue is rarefied.

A sanguinolent liquid of the nature of that we have just described is often observed between the bone and its internal and external periosteum, which is always thickened. The medullary canal is more or less narrowed, and the medullary substance itself infiltrated with blood; it presents a more decided colour than usual.

2*nd Stage. Stage of distortion.* It is in this stage that the distortion of the bones is especially apparent; their swelling and curvation may be here studied; they constitute the prelude of rachitic deformities.

The bones are very much enlarged, especially at their extremities, on the spot where the spongy tissue is very abundant. This swelling is accompanied by molecular alterations which may be easily recognized. Those of the epiphysary cartilage have been quite recently studied by M. Broca. They are revealed by the presence of a semi-transparent zone larger than that of the normal condition, itself composed of two or three juxta posed secondary zones, placed between the epiphysis and the diaphysis. The cavities of the cartilage are enlarged, and their corpuscles modified in their form, position, and structure. They are flattened, deformed, and crowded together in the midst of a fibrous tissue almost entirely deprived of saline matter, and causing no effervescence with nitric acid.

The adjoining osseous tissue is also swollen. This enlargement is explained by the arrest of ossification, the deposit of intra-cellular plasma and the softening of the osseous tissue which results from the dilatation of the internal cells of the bone.

The liquid with which these cells are infiltrated loses its black colour and fluidity; it is reddish, and assumes a gelatinous, semi-transparent consistence; it adheres firmly to the surface of the bone and to the interior of the cells; it becomes organized after the manner of false membranes, by means of capillary vessels of new formation. It becomes transformed, according to M. Guérin, into spongy tissue, which every day becomes more dense and more voluminous, and which is filled with an immense number of very fine and very irregular spaces.

The development of this spongy tissue in its cells at the interior and exterior of the bone, determines the compression, the crowding together, and in great part the destruction of the osseous lamellæ. The resisting parts of the bone daily diminish; they are replaced by this soft and supple mass of new formation. Then the bone no longer offers resistance, and it may be bent at will by the least effort.

Beneath the periosteum this tissue is very unequally diffused; it is very abundant at the situation of the concavity of the bones, and, on the contrary, is very rare at the convexity; it appears that the tension of the periosteum on their convexity presents an obstacle to the

formation of this tissue, and that this circumstance, on the other hand, makes it accummulate towards their concave portions.

3rd Stage. Stage of eburnation. The modifications of the bone are entirely different, according as the disease terminates favourably by the consolidation of the softened bones, or, on the contrary, according as the disease leads to a complete disorganization of the osseous tissue.

In the first case, the spongy tissue of new formation becomes tranformed into compact tissue and slowly ossifies; fresh bone is formed in the medullary canal, in the tissue of the bone and at its exterior, which replaces that which has been altered, and which gradually assumes the natural form of the destroyed bone. This ossified tissue is the more dense in proportion to its age; it is white and pearly, very compact, and resembles ivory; whence the term *eburnation* applied to this stage of the disease.

The consolidation of the softened bones does not always takes place; in this case the spongy tissue of new formation, after having separated or destroyed the osseous lamellæ which afford to the old bone all its consistence, itself remains supple and unresisting, and does not present any process internally which might might lead us to believe in its ossification. This is what M. Guérin has termed rachitic consumption of the bones.

As we observe to be the case in rachitis, the osseous tissue is very extensively altered. *The infiltration of the bones by the calcareous substances does not take place*, and the liquids effused are entirely deprived of these materials. Chemical analysis, moreover, confirms these results, since there has been found in the rachitic bones, compared with ordinary bones, immense differences in the quantities of the salts which they contain, and especially in the proportion of phosphate of lime. The diseased bones do not contain more than one third in weight of calcareous substances, and the other two thirds are made up of animal matters. In the normal state, there is, on the contrary, one part of animal matter to two of earthy constituents. Such at least is the proportion given by Berzilius.

The action of rachitis is confined to the bones. The teeth, the structure of which is entirely different, do not participate in the general softening of the bones of the skeleton. They sometimes become detached, but their loss is the result of modifications which the maxillary bones undergo. Their structure is never altered by the disease; their eruption from the alveoli is simply retarded.

[Stanley (plate xx—*Illustrations of Diseases of Bones*), gives three drawings of rickety bones: 1st, the soft stage; 2nd, the hardening and thickening of the walls of the bent bone along the cavity of the curve; in the 3rd the curve is more angular, and the bone at that point is solid without medullary tube or cells.

He has found out that, from the eighteenth to the twenty-fourth month, is the

most common period for the commencement of the disease, a fact no doubt dependent on this being the epoch when the superincumbent weight begins to tell most upon the spine and lower limbs, whilst the predisposing causes may have been excited into activity by the debilitating influence of a difficult dentition. Rachitis has, nevertheless, been met with in the fœtus. The first indication of rickets, says Mr. Stanley, is a diminution of the firmness of a bone, from the separation of its lamellæ and fibres, accompanied by an altered character of its medulla. The most recent and minute description of rachitis is to be found in Virchow's work—from which extracts referring to this subject have appeared in the *Edinburgh Monthly Journal of Medicine* for April, 1854.—P.H.B.]

Symptoms.

It is a difficult matter to discover the precise epoch of the invasion of rachitis. This disease becomes developed in the course of several serious affections of the respiratory or digestive organs, in children otherwise in good health, but imperfectly nourished and placed under unfavourable hygienic conditions. It appears slowly, and only manifests its presence when it is already very much advanced. It is then only that we can recognize it.

The children appear sad and depressed; they have difficulty in moving, and prefer remaining sitting or lying down, which they testify by their cries when they are not in a condition to express their sensations by means of speech. They suffer much in the bones, and cry out when they are touched or when they are removed, and pain is especially the cause of this. They even suffer when they are not touched, chiefly in the middle of the night. They often have attacks of fever, and perspire much more than usual. Their face is pale, the skin becomes yellow and wrinkled, the appetite falls off, the digestion is disturbed, diarrhœa appears, and the urine deposits, on cooling, an abundant calcareous sediment.

These symptoms sometimes continue for a considerable time, and we know not to what disease to refer them. Their origin is at length discovered when, at the end of from two to four months, the distortion of the limbs becomes apparent. It is then that the nocturnal pains, or those caused by the movements, are most acute, and cause the children to cry out to a greater extent.

The form of the bones of the legs, thighs, arms, vertebral column and ribs, becomes successively modified. At the lower extremities, the epiphyses of the long bones enlarge, and present species of nodosities; the articulations are increased in size, so that the children are said to be *knotty*. The diaphysis of the bone becomes curved in its turn, and the limbs twisted. The tibiæ and the femora are the first bones to become deformed. The tibia is usually curved so as to present a convexity forwards and outwards. The curvature of the femur closely resembles it. These deformities are not invariably the same, for they are often modified. We have just pointed out those

which are the most frequent, and which may be explained by contraction of the muscles. Thus, in some children, the knees are closely approximated, and the legs thrown outwards, so that they walk circuitously, and by resting in the internal edge of the tarsus; in others, the knees are, on the contrary, widely separated, and the feet, in moving, have the greatest difficulty to find a convenient support on the ground.

The long bones of the upper limbs become curved with the same facility. The arm being extended, the radius and the ulna are curved so as to form a projection outwards. The humerus is less frequently affected than the other bones.

The vertebræ are also softened, and from this, more or less considerable distortions of the vertebral column result. These deformities are not established in all rachitic children. Anterior curvature, with projection of the lumbar spinous processes, is rather frequently observed. As to lateral curvature in its various forms, it is infinitely more rare.

The ribs undergo a peculiar distortion. They appear broken in two places in consequence of the depression of their middle portion. Their posterior curvature is increased and angular; they then straighten again and become curved a second time, at a rather decided angle towards the anterior part, near the point of union with the costal cartilages. The chest is then depressed on the lateral parts, sometimes channelled, and the sternum is carried forwards. Thence a considerable diminution of the transverse diameter of the chest results, a very serious circumstance for the future, as it gives rise to a predisposition to diseases of the heart and lungs.

The pelvis is subject to the general law, and when the rachitis is well characterized it becomes distorted in the most irregular manner, either from before backwards, or laterally, or, lastly, in its oblique diameter. This distortion possesses great importance in girls on account of the functions of the uterus. The parents should be warned of it, for they should not be ignorant of the existence of such a deformity, one of the greatest obstacles to parturition. It is true, at least generally so, that these distortions are only met with in rachitic persons so deformed, whose limbs are so much twisted that there is every probability that they will not contract marriage; but they are also met with in rachitic individuals who have only presented a slight modification of the long bones, and who, when dressed, show no deformity. With regard to these, the state of their pelvis should be carefully examined, and this vitiation of form should be declared, so as not to expose the women to contract marriage, which would be for them, in case of pregnancy, the source of the greatest dangers, and even of death itself.

The bones of the head and the flat bones, the scapula for example,

are sometimes also, but more rarely, the seat of rachitic deformity. The head becomes of large size and irregular; it sometimes resembles that of hydrocephalic infants; the fontanelles do not unite, and the brain acquires an enormous size. The deformity of the scapula is a rather serious matter; for at the period of the cure of rachitis, consolidation arrests, in a final manner, the form of these bones, and thence great difficulty in the movements of the arm results.

The development of the jaws is arrested, and the dental arches modified by their organic disposition, no longer spread as usual, for the teeth ready to appear. Thence a more or less prolonged delay in the appearance of the teeth results. This characteristic alone is is almost sufficient to predict the presence of rachitis.

Such are the various distortions which are met with in children attacked with rachitis. It must be admitted that they are not always present. Even in the majority of cases, the softening of the bones is not complete; it only invades the limbs, and the lower limbs in preference. We often observe subjects who have the limbs distorted, whether in consequence of the enlargement of the articular extremities, or by curvature of the bones, who have not at the time any other deformity. If at this period we take the disease in hand, we may cure it, and the limbs are observed to resume their natural form and straightness.

Amongst the general symptoms which accompany the stage of distortion in rachitis to which we have just alluded, there are some which it is necessary to study carefully, for they possess an extreme importance in the diagnosis of the disease.

The children, as has been stated, are pale; their tint is yellowish and unhealthy; they appear etiolated. The appetite is lost; they sometimes vomit, have often diarrhœa, and the abdomen is of large size and frequently painful.

The fontanelles remain open, the articulations voluminous, *knotty*, as is said, and great delays and numerous irregularities occur in the process of dentition.

These children wish to remain quiet, sitting or lying down, in consequence of the pain caused by motion. I have seen one continually squatting on the knees of its mother, remain sitting, the belly applied on the thighs, the vertebral column inclined forwards, on the level with the loins, who would not suffer himself to be moved, and who uttered loud cries when touched.

The distorted limbs are very painful. All rachitic children cry out loudly as soon as their limbs are examined. Pain is really the cause of these cries. In fact, as soon as the disease is arrested in its progress or near its cure, the limbs of the little patients may be touched and handled without fear of causing the tears to flow.

The softening of the bones can be easily demonstrated through the soft parts which cover them. In young rachitic children at a slightly advanced period of the disease, movements without elasticity can be communicated to the limbs, like those which are given to a piece of lead. I have myself twisted, always with a certain caution, the fore arm and the limbs of several rachitic children. These parts remain in the position which is given them until they are returned to their natural position. This readiness to yield under pressure has always its limits. Doubtless the bone would finally break if it was submitted to too great an effort. When the rupture takes place, it is always incomplete; the fibres of the bone are twisted like the fibres of a stalk of wet straw, and, to speak correctly, there is no solution of continuity between them. This is what is termed rachitic fracture.

It is important to be aware of the circumstance I have here alluded to; for very frequently rachitic children are seized and carelessly raised by the arm, which determines the incomplete fracture of the humerus. When we examine the patient, we discover excessive mobility of the bone, without crepitation; and if we do not take into consideration the general condition of the subject, it might happen that an error in diagnosis would be committed, and that what is only an incomplete rachitic fracture might be taken for an ordinary fracture.

[Rickets possesses an influence in arresting the development of the face, by which a disproportion is produced between it and the cranium, the result being that the latter appears to be abnormally enlarged. The changes in the spine are referable to the yielding of its weakened fibro cartilages and ligaments; the consequent curves and the action of the muscles on the ribs produce the thoracic distortion; and the growth of the pelvis is interrupted—a condition which all rickety bones partake of: the necks of the thigh bones lose their obliquity from the superincumbent pressure, and their shafts, as well as those of the tibia and fibula, become curved from the same cause. Cases are reported in which the femora were so abruptly bent, that the two extremities of each shaft formed at their mid-junction an angle somewhat exceeding a right angle. Occasionally bones are capriciously affected with rickets, a single bone being arrested in its growth or curved without any assignable cause that would not equally apply to other parts of the skeleton.—P.H.B.]

Complications.

Rachitis often exists alone, but it may be complicated with other diseases. In these cases, it existed before their invasion or it has become developed in their course. It possesses no connection with them; their appearance is the result of a simple coincidence.

If rachitis has no affinity with most of the diseases common to children, it possesses, on the contrary, a kind of repulsion for several of them. Thus there may be established between rachitis and pulmonary or mesenteric tubercles, the same law of antagonism which M. Boudin has endeavoured to establish between intermittent fever and these same

diseases. This observation has been made by M. Guersant, who has published it in his article on rachitis. Its truth has been demonstrated by the labours of M. Rufz, who has only met with, at the hospital, a very small number of tubercular cases amongst children attacked with rachitic degeneration of the bones, whilst, on the contrary, the tubercular affection was present in two thirds of the children who died from other diseases. In consequence of the distortion of the thorax, very considerable dyspnœa, and obstruction to the circulation sometimes result, and consequently hypertrophy of the liver and some organic affections of the heart.

Diagnosis.

It is very difficult to recognize rachitis from the general symptoms which precede the deformity of the limbs, indeed it must be confessed that it is a matter of impossibility. The disease can only be recognized at the period when dentition is observed to be arrested, the fontanelles open, the articulations increased in size, and the limbs, more or less painful, curve of themselves or readily bend under pressure of the fingers. At this period the diagnosis is certain, and no disease can be mistaken for rachitis. I do not here refer to the diagnosis between rachitis and osteomalachia, since I combine these two affections which some consider distinct, and I look upon rachitis as the osteomalachia of infancy.

There is a disease which becomes developed at the termination of childhood and in the adult, which must not be confounded with rachitis, notwithstanding the connection which might be established between these two diseases — I refer to the deviation of the dorsal spine, which is the consequence of muscular retraction. Here, we equally observe distortion of the vertebræ and lateral curvature of the vertebral column to the right or left side; but this disease is often hereditary and rachitis is not so; it is a local disease and rachitis is a general affection; one is a disease of children, the other a disease of adults; lastly, there is is in the one, an alteration in the bones in consequence of modifications taking place in their chemical composition; in the other, the structure of the bones is not altered, their form alone changes under the influence of the unequal compression exercised by the vertebræ upon each other.

It is not then possible to mistake the rachitic distortion of the spine, which is accompanied by distortions in the other parts of the skeleton, with the curvature of the vertebral column, which is said to be the result of muscular retraction.

Prognosis.

The prognosis of rachitis is not very unfavourable at the commence-

ment of the disease, for then there is every chance that it will be cured; it is, on the contrary, a very serious disease when the softening of the bones is general and when the skeleton is deformed to a considerable extent; for if the progress of the disease can be arrested, the consolidation of the bones is generally observed in a vicious position, and terrible deformities thence result.

In young children, the curvature of the limbs, even when it is rather decided, disappears shortly after the cure of the disease, and the extremities of the long bones gradually resume their natural size.

When rachitis has determined the distortions previously alluded to, and when the chest has been considerably modified in its shape, so great an obstruction to the functions of the lungs and of the heart results, that the patients sooner or later succumb to the affection of these organs. Amongst the affections of the chest, diseases of the heart and of the great vessels are the most frequent in rachitic cases.

The cure of rachitis without deformity or with slight distortions is the most frequent termination when the disease is treated from its commencement. A very curious phenomenon is that which consists in studying the sensations of a young child whose station and progress have been interrupted by the invasion of rachitis, and who is on the eve of recovery from this disease.

In the practice of M. Trousseau I have closely watched a child placed in this position; it successively lost its apathy and indolence; its limbs were no longer painful, and it wished to move, although it was impossible for it to do so. Incapable of expressing its wish by words, but sufficiently intelligent to make itself understood by its mother, it interrogated her with a look until she proposed to assist it to walk; then it manifested its pleasure by loud exclamations, and its face lightened up in so singular a manner, that it was impossible to look at it without laughing. Each time that the words, Will you walk? were addressed, it uttered the same cries; and if it was taken up by the arms, it kicked about its legs, which it could not have done some days before on account of the pain occasioned by these movements.

Treatment.

Rachitis is one of the diseases of children which requires the greatest attention on the part of the physician, whether with the intention of remedying the morbid phenomena already present, or in case it should prove necessary to prevent ulterior accidents.

On the one hand we must effect a modification in the constitution of children whose nutritive functions are altered; we must prevent the softening of the bones from becoming more considerable, and on the other hand we should take precautions that this deformity of the bones does not become the origin of an incurable deformity.

Such is the double aim that the physician is called upon to attain for the children labouring under rachitis.

The regimen of the children, the place of their dwelling, their mode of life, their hygiene, in a word, should be carefully directed. The action of these various influences should be judiciously combined so as to arrive at a satisfactory result. The attempt to divide them would only tend to weaken their beneficial action.

In young children still at the breast, the general health and the qualities of the milk of the nurse should be examined into, so as to effect a change if the conditions presented do not offer all the guarantees desirable on this head. The patients should be confided to good nurses, who should suckle them until twelve or fifteen months of age. At the same time cow's milk, buttermilk, a small quantity of fatty food, and sometimes a little sweetened wine and water, may be given. It is useless, and I may even say dangerous, to feed them often with beef-tea, soups, fresh meat, &c. These kinds of food are too heavy for children; and even although they may digest them, it is not the less true that they should be reserved for children of more advanced age whose organs are more robust and better resist fatigue.

The laws of nature should be followed as much as possible; this would not be the case by feeding a young child with meat, when milk should form the principal article of food. Many persons do not regard it in this light; but they believe, on the contrary, that they favour the development of children by this succulent nourishment. The human race suffers from it; infirmities overwhelm it, and amongst their number must be reckoned rachitis, which often results from this practice. In this matter we are less favoured than animals, which never present either lame or deformed, and which, in return, follow no other system for the nourishment of their little ones than that which is communicated to them by the laws of nature.

In conjunction with light nourishment of good quality, proportioned to the age of the children, the patients should be taken into the country and allowed to enjoy the open air and sunshine. Exercise reanimates their appetite, and the solar influence, by exercising the functions of the skin, imparts to the tissues in general a vigour which they would never acquire in the shade.

The medicines to be administered in rachitis are not very numerous, or at least there is only a small number of them, the efficacy of which is such, that they can be employed against this disease.

Steel, bark under all its forms, and bitters, have been successfully administered; but these means are less useful than those to which I am about to allude, and upon which I entirely rely. Cod liver oil is the most useful remedy to employ in the treatment of rachitis; and it is one, the action of which is the most constantly followed by

favourable results. It constantly arrests the rachitic process going on in the bones, and affords to the economy the power of forming again in its interior the desired quantity of calcareous substances which are necessary for the consolidation and the reossification of the softened bones.

Cod liver oil may be given in the dose of from ℥ vj to ℥ j to young children, in double the quantity of simple syrup. The dose may be increased to ℥ ij in children of more advanced years. The brown oil is infinitely preferable to the white oil, which is thus changed by purification.

This medicine, the odour and taste of which are very disagreeable, is at first very repugnant to the patients; but they soon become accustomed to it, and ultimately take it without trouble, and I might even add with satisfaction.

Skate liver oil, known under the name of fish oil, may be substituted for it, and it is much less expensive. Its qualities are moreover precisely the same as those of cod liver oil. It is given in the same dose and is administered in the same manner.

I have often had occasion to witness the wonderful effects of this medicine in the practice of M. Trousseau, who, after the example of the older physicians, always administers it in the disease we are now considering. I have seen children, very much afflicted with rachitis, whose limbs, already curved and supple like a piece of lead, became consolidated in fifteen days, and afterwards gradually assumed their natural straightness under the influence of this plan of treatment. Since then I have several times, in similar circumstances, administered this medicine, and it appeared to me to be quite as useful as I have just stated.

Diminution in the softness of the bones, and resistance of the limbs to the attempts which are made to bend them, are the first phenomena which indicate the beneficial action of cod liver oil. If their distortion is not too considerable, they gradually resume their natural direction. If, on the contrary, the distortion is very great, we must reflect on what we are going to do, for we run the risk, in giving the cod liver oil, of consolidating the bones in the vicious position which they have assumed, and we could not make them return to their natural position. It is proper, then, to combine with the influence of this medicine, the action of means capable of retaining the limbs in an advantageous position during the time of their consolidation.

In this manner we prevent the rachitic distortion becoming the origin of an incurable deformity.

However, several persons deny the efficacy of the cod liver oil, and, in Belgium, the oil of sweet almonds, oil of poppies, or simply butter are substituted. They pretend to have obtained by this treatment

very satisfactory results worthy of being compared to those which always follow the use of cod liver oil.

The employment of retentive apparatus in order to remedy the rachitic deformities when the bones are yet very soft, has been objected to by several physicians. It has been followed by the greater number. The most simple means consists in placing pads or splints of pasteboard around the limbs in order to restore them to their natural straightness, and to make use of the extension bed when the vertebral column is the seat of the deformity.

["One condition essential to the proper use of all mechanical apparatus, wherever applied, is, that neither by its weight, nor by the mode of its application, should it restrict the free action of the muscles of the part which is the seat of the distortion. In other words, the apparatus must be so constructed and applied, that it can be worn without hinderance to the natural movements of the part. And, besides, it is desirable, for the full effect of mechanical contrivances, that their action should be continuous, not remitting. Directly the restraint they impose is withdrawn, or even lessened, the muscles, aided by the contractility of the other tissues surrounding the distorted bone or joint, will begin to reproduce the distortion. And this evil tendency will continue long after the apparently perfect restoration of the part to its right form and position." —Stanley, *Op. Cit.;* p. 231.—P.H.B.]

With respect to well-established rachitic deformities, after the cure of rachitis, when the consolidation of the bones has taken place, it is useless to think of curing them by means of orthopedic apparatus. It is here that the opinion of Boyer, of Richerand, and of Astley Cooper deserve consideration; these practitioners are, in fact, opposed to the mechanical treatment of these deformities, and they are in the right: first, because the treatment is without result; secondly, because this conviction has only been obtained after the children have passed several months, to the detriment of their health, in various species of apparatus, the application of which is very disagreeable and very painful. It is not worth while to increase the sufferings of the patients, since there is much uncertainty of being able to cure them.

APHORISMS.

332. Rachitis and osteomalachia constitute one and the same disease, modified by the age of the individual.

333. Rachitis is the osteomalachia of children.

334. The patency of the fontanelles and the tardy eruption of the teeth, indicate the commencement of rachitis.

335. The enlargement of the articulation is the second degree of rachitis.

336. These enlargements, combined with the impossibility of standing

or walking, and accompanied with pain and softening of the bones, indicate true rachitis.

337. Rachitis is a serious disease, one which interferes with the process of growth and always arrests it below the degree it would have otherwise attained.

338. Rachitis is the cause of a great number of deformities in the bones of the head, limbs, thorax, and pelvis.

339. There is often an antagonism between rachitis and tuberculization.

340. Children can be made rachitic at will, by the continued use of an improper regimen.

341. The premature use of meat and of fat or farinaceous aliment has produced more cases of rachitis than the most strict milk diet.

342. The absence of air, of exercise, and of light, adds very much to the effect of improper food in the production of rachitis.

343. Milk, butter, broths, and thin soups, combined with the action of the open air and sunshine, often suffice for the cure of rachitis.

344. Cod liver oil, in the dose of ℥j a day, is the specific for rachitis.

CHAPTER II.

ON FRACTURES AND ON SEPARATION OF THE EPIPHYSES IN YOUNG CHILDREN.

The term *fracture* is applied to the complete or incomplete rupture of the fibres of the continuity of a bone. It is a rather rare accident in infants and children at the breast, and it must not be confounded with the *separation of the epiphyses*, another accident peculiar to the tender age. *Separation of the epiphyses* is, in fact, characterized by the solution of continuity of a bone at the extremity of its osseous fibres, and without rupture of these same fibres. These are the two forms of the solution of continuity of bones in young children. They have been investigated by M. Salmon, in his inaugural thesis, which is only wanting in clinical cases.

Fractures are *congenital* or *acquired* after birth. It is said that children have been observed to be born with fractures caused during intra-uterine existence, by a blow or a fall on the abdomen of the mother. These instances are very rare, but I shall relate one or two examples of them. The fractures usually take place after birth. They are observed on the long bones in preference to the flat and short bones.

They may take place in the various points of the extent of the long bones; they are most frequently observed at their middle portion where it is more slender; in other cases, it is towards one of their extremities, and then a separation of the epiphyses is more frequently produced.

The fractures are usually *simple;* they are *oblique* and often *incomplete*, and as Marjolin, Sanson, Campaignac observe, amongst the osseous fibres, some break, others bend, just as is remarked in the incomplete rupture of a fresh reed. Some fibres break, others become curved, and the periosteum still encloses them and maintains the bony fragments.

[A table in Malgaigne's work (*Traité des Fractures et du Luxations.* Paris, 1847; p. 4) represents the relative frequency of fractures in young children, the materials being supplied by the records of the Hospital for Children. This shows that fracture is most frequent between the ages of two and four, and less frequent between four and five; but again increasing, though in diminished ratio, up to seven.—P.H.B.]

Causes.

Fractures are the result of direct blows, or of falls upon a limb; they are produced in consequence of a considerable strain on an articulation in a child who is improperly raised by one of its arms, but in this case it is rather a separation of the epiphyses which takes place.

However, all these causes only act in a consecutive manner, and nearly always under the influence of a general diathesis of hereditary syphilis and of rachitis, which render the bones more friable. Rachitis especially modifies the chemical composition of the bones to such an extent that not one child, attacked with this disease, escapes the accident of one or several rachitic fractures. Children have been observed who could not be moved in bed without fracture of a limb. This is a fact commonly observed in hospitals for children.

The symptoms of fractures in children are mobility, displacement, and pain, &c.

Preternatural mobility is only observed in fracture of parts composed of a single bone, or in fracture of two bones of which certain limbs are composed. It is more or less marked, according to the degree of the fracture, and according as it is complete or incomplete.

The displacement is never very considerable in young children; this may be readily understood; there can only be displacement in the case of complete fracture; but this scarcely ever takes place except at a rather advanced age, towards the third or fourth year.

Pain constantly accompanies fracture, and no movement can be given to the affected limbs, without causing the children to cry out very much.

Crepitus is very rarely observed in infants, and in the case of rachitic fracture, the bones may be moved without giving rise to any sound.

The diagnosis of fracture in the young child is not difficult when it takes place at the middle portion of a long bone. The mobility, displacement, and pain, are sufficient to establish the nature of the disease. But the same is not the case when the fracture is situate at the extremity of a bone or on a flat bone. In the first case, it is often difficult to discover whether the accident is caused by a fracture, a sprain, or a separation of the epiphyses. It is especially important not to confound it with a sprain, and thus apply a useless apparatus. In the sprain which is especially observed at the wrist, when the parents violently raise the children by the hand whilst in bed or on a carpet, to make them play, or walk, the wrist becomes very painful and very much swollen, but there is neither displacement nor crepitus; this ought to be sufficient for the diagnosis. In *separation of the epiphyses*, besides the pain and the swelling, there is preternatural mobility, and often a dull, *grating* crepitus, very different from the crepitus of bone, and which indicates a solution of continuity. Fracture is never accompanied with crepitus when it is situated at the extremities of a bone, in the first year of existence.

The treatment of fractures in infants and children at the breast consists in the use of retentive appliances, very similar to those for the adult. Pads and bandages moistened with adhesive liquids and rolled round the situation of the fracture; small pasteboard splints of sufficient solidity and not too tightly bandaged; the employment of starch or dextrine bandages; such are the means to be used in *fractures and separation of the epiphyses* in young children.

The only precept relative to the treatment which I would here insist on, is not to allow the apparatus to be left on too long a time; to remove them as soon as possible, at the end of fifteen days, three weeks at the latest—to be reapplied if it is considered useful. This period is generally sufficient for the consolidation of the fractures.

There is one circumstance which must not be forgotten in the treatment of these fractures, this is general antivenereal or antirachitic treatment. Cod liver oil may here be of very great service; it should be employed in the manner described in the chapter on rachitis.

Some particular observations of fractures in young children now follow. I publish them as a commencement of the series of those which in future will be of service to others, to trace more completely than I have been able to do, the history of fractures of children.

1st. On Fractures of the Cranium.

Fractures of the cranium have been occasionally observed in infants;

Roederer, Cooper, Siebold, Chaussier, Dugès, and M. Danyau, have reported instances of them.

These fractures are the result of parturition and of pressure of the head of the fœtus against the sacro-vertebral angle, against the pubis, or between the two blades of the forceps. There may be fracture and depression, depression without fracture, or simply a fissure. It is not the most compressed part which is always the seat of the fracture, this may occur in a distant or opposite situation; thus M. Danyau has observed indirect fracture of the arch of the orbit.

Fractures of the cranium in infants are usually observed on the parietal bones, then on the frontal, the occipital, and lastly on the temporal bones. They are either linear or starred, with or without depression; separation of the pericranium, of the dura-mater or meningeal hæmorrhage rather frequently accompanies them.

Fractures without depression and without complication often pass unnoticed, are without importance, and very easily get well. Those which are complicated with meningeal hæmorrhage present some of the phenomena of compression of the brain which have been described on the subject of meningeal apoplexy, and the children may live several days. Fractures with depression are the most serious of all, but they do not lead to the immediate death of the children. Some may live several days and some have been observed to recover. Dugès cites the instance of two children who survived and who had, one, a depression of the frontal bone with nearly complete exophthalmia of the left eye without convulsions or paralysis; the other, a depression of the parietal bone of the size of two inches, and half an inch deep, followed by strabismus, convulsions, contraction of the limbs for twenty-four hours, drinking readily at the end of two days and completely cured, the cranial depression disappearing at the end of a fortnight.

[The frontal and parietal bones are the only ones which Dr. Weber has seen fissured and fractured by the act of parturition. According to the greater or less extent of the fracture, and particularly the distance of separation between the edges of the injured bone, so is the amount of injury to the vessels of the locality of the fracture. Rupture of small vessels always occurs, as is proved by the most delicate fissure being indicated by a red streak. The periosteum is generally elevated by extravasated blood, and there are marks of sugillation from effusion into the cellular tissue of the scalp. In these cases internal cephalæmatoma may occur. But the extravasation here alluded to must be distinguished from those which follow rupture of the longitudinal sinus of the larger cerebral veins. It is true that both forms may be present, but, according to Dr. Weber, the latter are not the consequences of the fracture, but rather of the same cause which gave rise to the fracture—namely, "a too violent forcing of the bones over each other." Bednar, besides referring to the fissures and fractures, remarks that "In the cranial bones of new-born children, chincks are sometimes observed running from the surface for several lines deep into the bone, generally in a somewhat oblique direction." Their origin he cannot explain, as

from the yielding character of the bone we are unable to produce them in the corpse by stroke or pressure.—P.H.B.]

2ND. FRACTURE OF THE INFERIOR MAXILLA.

The inferior maxilla is sometimes observed fractured by the very deed of the accoucheur who, introducing the finger into the mouth of the fœtus and making too violent tractions, separates the symphysis, or fractures the bone in some other part of its extent. The same accident may happen in consequence of the vicious position of the head at the time of the process of delivery.

We should endeavour to keep the fragments of bone in close approximation by means of the four-tailed bandage, and the child should be fed by the spoon with milk slightly sweetened, until the bone becomes consolidated, when it may suck the breast or the feeding bottle.

3RD. FRACTURE OF THE CLAVICLE.

M. Devergie, the elder, has related, February 24th, 1825, at the Academy of Medicine, the case of a woman who, at the sixth month of pregnancy, struck herself violently against the angle of a table in falling from a high chair. The pain was exceedingly acute and continued for some time without anything alleviating it; it insensibly disappeared, and at the ordinary period of pregnancy, this woman was delivered of a healthy child who presented a tumour of large size over the situation of the left clavicle; it died on the eighth day, and on examination of the body, fracture of the clavicle was discovered, the fragments of which, slightly overlapping each other, were united by a solid and large callus which formed the tumour above referred to.

Fractures of the limbs are very often observed to occur during the accouchement or after birth; they are recognized by the same symptoms as those which occur in adults, and should be treated by the same means.

The clavicle is sometimes fractured in the fœtus, when the arms, placed behind the neck, are returned in the wrong direction. In this case it is sufficient to place a pad of cotton in the axilla and to keep the arm fixed across the body, the hand raised toward the opposite shoulder, never exercising any great pressure on the thorax.

4TH. FRACTURE OF THE HUMERUS.

This fracture may be congenital or acquired. Billard has observed a case which belongs to the first variety.

The child which fell under the notice of Billard was two months old, and died of pneumonia. "The humerus is moveable at its middle portion, where a kind of false joint exists; there is a solution of continuity in the osseous substance of the middle portion of the humerus, and in an extent of four lines; this space is filled by a rather thick

cartilaginous substance, the extremities of which are in contact with the broken extremities of the bone, like the epiphyses are with the bones to which they belong." This humerus was not longer than that of the opposite side, whence it resulted, according to Billard, that the portion of cartilage uniting the osseous extremities was a primary rudimentary cartilage of the bone which the ossification had not destroyed.

This is, in my opinion, an error of interpretation; the child had had, in the mother's womb, a fracture, which was in process of consolidation.

5TH. FRACTURE OF THE TIBIA.

The following case of M. Caras is a very curious one. It occurred in the child of a young woman twenty-five years old, of good constitution, who, at the sixth month of pregnancy, had a fall on the abdomen, and immediately felt her child forcibly move and then be still.

At the term of her pregnancy a thin, feeble child, scarcely showing signs of life, came into the world with a transverse wound, nine lines in length, situated on the right leg. This wound, the lips of which were pale and flabby, extended from one malleolus to the other, involved the skin and the subjacent muscles, and was accompanied with fracture of the tibia. The body of this bone was entirely separate from the inferior epiphysis; it protruded externally from the wound, had lost its periosteum, and presented a bad appearance. Attempts were made to reduce it, but without effect; they were obliged to be given up because the edges of the wound were attacked with sphacelus, and the necrosis made progress. The disease rapidly extended, and the child died at the thirteenth day.

[The most remarkable example of fracture occurring in the womb, and related by Malgaigne, is one in which no external injury was received by the mother, but she heard, during a movement of the child, a noise like the breaking of a stick. She was delivered six weeks afterwards of male twins, one of which had a broken thigh.—P.H.B.]

6TH. SEPARATION OF THE EPIPHYSES.

The following is another case of a very different nature, and which equally relates to a solution of the continuity of the bones. It is separation of several epiphyses accompanied by alterations which may be regarded as syphilitic. The case belongs to M. Valleix, and has been published in the *Archives* and in the work of Billard.

Case. Separation of several of the epiphyses of the long bones, with abscess beneath the periosteum, and remarkable osseous productions in a newly-born child. Foulon (Alexandrine), of female sex, born September 5th, 1834, was sent to the infirmary of the Enfants Trouvés, in the ward of M. Thévenot, on the 14th of the

same month, for *several very small pustules, containing a drop of white pus*, and surrounded by a small circle, of a not very deep red colour, which were observed on the neck and chest. The cry was strong, the eyes well open, the tongue moist, abdomen soft, respiration was readily performed, and the child was in good condition. From information at the office we learnt that this little child was brought to the house of accouchement with only this note: Healthy child, and proper to be given to a nurse immediately.

A bath of bran water was prescribed, milk, and rice cream.

The next day, 15th, it was observed that the child could not move its left arm, and that it cried much when it was wished to make it execute these movements.

The examination of the limb did not offer anything remarkable in any portion of its extent. The look is fixed, and anxiety is depicted on the countenance.

It being considered that the state of the arm might depend on a lesion of the brain, a leech was applied behind each ear; the rice cream was discontinued, and only a little milk given.

16th and following days in the same state. 20th. Slight diarrhœa of yellowish matters.

21st. The child moves the left arm with more facility, the look more calm, the diarrhœa has ceased; it is considered convalescent; but, on the 26th, there was perceived, at the inferior part of the right fore arm, below the radio-carpal articulation, a large tumour which occupied the inferior third, entirely surrounding the radius, and presenting a very evident fluctuation. In whatever spot the hand was placed around the tumour the wave of the liquid was felt passing to the opposite side, and it was discovered that the abscess passed above the external margin of the radius, gaining the posterior surface of the fore arm, but on the side of the ulna all appeared in the natural state. These examinations are painful, and the child keeps the hand and the fingers semi-flexed. The diarrhœa has reappeared, the respiration is constrained, the face is contracted and expresses suffering; the lips are red, dry, fissured, the tongue is moist and presents some patches of thrush scattered here and there; abdomen painful on pressure. Rice and gum water, draught with syrup of poppies; poultice to the abdomen and to the swellings.

27th. A tumour, also fluctuating and painful, has appeared at the scapulo-humeral articulation of the left side. It appears to occupy this articulation; and forms a considerable projection at the upper part of the shoulder. The deltoid is considerably raised, and a finger applied under the axilla perfectly feels the movement of the liquid, when slight pressure is exercised below the external extremity of the clavicle. The eyes are dull, the eyelids surrounded with a black circle, the expression of the face depicts great suffering, thrush has made progress; the respiration is much more obstructed; the pulse is feeble, thready, irregular; great depression and sighing.

The same prescriptions.

28th. Died at six o'clock in the morning.

Autopsy. The tumour at the shoulder contained about one ounce of thin inodorous pus. The superior portion of the body of the humerus is entirely denuded to the extent of about ten lines; no change of colour or consistence is observed in it; its form is well preserved, but there is a complete separation of the epiphysis, whence a kind of false articulation with a reddish and rough surface, entirely bathed in the pus, results. At the superior extremity of the humerus, the cells of the spongy portion are observed, which contain a small quantity of purulent matter. The walls of the abscess are formed by the separated periosteum, which is then transparent, shining, and adherent to the surrounding cellular tissue; at the inferior part of the purulent collection, a little

above the insertion of the deltoid, this membrane is observed to be attached to a bony prominence, of a spongy appearance, irregular, elevated more than a line above the surface of the bone, the decaying portion of which extends below the middle portion of the humerus. The periosteum is entirely in contact with this osseous production; it is even difficult to separate it from it. All the muscles of the upper part of the arm, as well as the nerves and the axillary vessels, have been displaced by the collection of pus. The deltoid was considerably raised, the scapulo-humeral articulation perfectly healthy.

The tumour at the wrist contained as considerable a quantity of pus as the first; the inferior extremity of the radius was bathed in the pus. It was also separated from its epiphysis, its appearance was similar to that of the extremity of the humerus, in the tumour at the shoulder; it was detached from the interosseous ligament and entirely deprived of its periosteum. An osseous production similar to the preceding, also spongy, and the interstices of which contained a small quantity of yellowish liquid, commenced by a sudden and irregular margin, at the point where the periosteum became again attached to the bone, and thence prolonged itself as far as the head of the radius, preserving nearly all its thickness and forming at the bone a kind of sheath, enveloped on all sides by the periosteum, which, far from being thin and adherent as in the arm, was thickened, shining on its internal surface, and could be so readily separated, that slight traction of the radius sufficed to detatch it entirely from this bone. Then the osseous sheath could be more readily perceived, it could be easily separated from the bone and raised by small portions. Its tissue was formed of longitudinal fibres; when pressed it became heavy, hard, and friable. The bone beneath, presented the appearance and consistence of healthy bone. The inferior part of the ulna and the articulation of the wrist were perfectly healthy.

The right leg did not present anything remarkable externally; but a deep incision, made at the internal part of the knee, gave issue to two spoonfuls of thick pus, of the colour of wine dregs, and inodorous.

The collection of pus was situated at the upper part of the tibia, the posterior and internal surfaces of which it bathed; it was confined at its internal part by adhesion of the periosteum, and at the external part by the interosseous ligament. Separation of the epiphysis, and denudation of the bone, as above.

At the inferior portion of the tibia, an abscess was discovered with precisely the same alterations as the preceding, the description of which it is useless to repeat. In consequence of this double abscess at the two extremities of the same bone, the abnormal osseous production formed a sheath occupying only the middle portion of the bone, between the two abscesses, terminating above and below by two swellings, the superior of which was more projecting than the inferior. It was entirely enclosed by the periosteum, and was observed in the same conditions as that which has been described in speaking of the radius.

A precisely similar abscess was discovered around the superior part of the left tibia; it was of less size and only contained half a spoonful of pus, of the colour of wine dregs, like the preceding.

In addition, the same separation of the periosteum, the same osseous production, but of smaller size, the same separation of the epiphysis. The inferior part of the tibia did not present an abscess like the other leg; its periosteum was not thickened, and adhered by cellular fibres which could only be broken by a rather decided traction, as in the healthy state. The epiphysis was not separated, but a very feeble effort sufficed to disunite the two surfaces, which were rough, dry, and of a deep red colour.

In the pelvis was an abscess situated in front of the sacrum, at its upper part to the left side, contained white consistent pus. On removing the walls of this abscess, it was discovered that all the left portion of its first sacral vertebra was denuded of its periosteum, that the left epiphysary eminence of this vertebra was separated from the rest of the bone by a division, the surfaces of which were rough, and of greyish colour; that the collection of pus communicated on one side with the lumbo-sacral articulation, the fibro-cartilage of which was entirely destroyed in its middle portion, and on the other with the sacro-iliac articulation, the cartilages of which were also destroyed, whence it resulted that the articular surfaces were very rough to the touch.

Of the two rami of the ischium, the posterior was separated from its cartilage, and a small quantity of pus bathed its extremity. The anterior was yet in connection with the cartilage; but a slight traction sufficed to separate it; there was no abscess below this point. The periosteum could be separated from the entire bone with extreme facility.

Some traces of inflammation in the stomach and small intestine.

The lungs were crepitant; in the whole extent of their surface, slightly projecting black spots were observed, the largest of which was of the diameter of a one-franc piece. *The pulmonary substance beneath these spots was of a very deep red colour, compact, and did not contain air.* This alteration extended to a depth of four or five lines. The altered patches were separated from the healthy substance of the lung by a very decided line of demarcation; there were about twenty in number to each of these organs.

The pericardium contained a small quantity of pure and liquid blood. Black blood in all the cavities of the heart and of the aorta.

The crural and iliac veins presented at distant intervals small spots and some membraniform filaments; their internal surface, smooth and shining, was of a deep red colour.

According to M. Valleix, it is very probable that the abscesses of the limbs and pelvis depended on an alteration of the bones occasioned by syphilitic disease. This is the more likely as the child at the same time presented the chronic lobular induration of the lungs, stated by M. Depaul to be characteristic of congenital syphilis. As to the osseous productions described in this case, he considers them as so many examples of what Lobstein has termed *diffuse osteophyte.* Their formation was very rapid; and on this subject M. Valleix states, that in a case of cephalæmatoma, he has observed a bony swelling of a line and a half in height become raised in one day. But this swelling, is it really of the osseous nature? M. Valleix does not state that he afterwards assured himself of it by dissection.

[Malgaigne attributes the first distinct and satisfactory notice of the separation of epiphyses to Bertrandi, towards the close of the last century, and cites some authenticated instances, in which it was produced from rough and careless treatment in bringing children into the world. The bones which suffered were the femur, tibia, and humerus. These accidents may ensue from analogous causes after birth and up to the time of puberty. They are, however, of rare occurrence, and require the same treatment as fracture in the same structures—a fortunate circumstance, inasmuch as we are unacquainted with any satisfactory diagnostic by which to distinguish between the two forms of injury.—P.H.B.]

BOOK XXIII.

ON DISEASES OF THE ARTICULATIONS.

CHAPTER I.

ON VICES OF ARTICULAR CONFORMATION.

The articulations of the skeleton present a great number of congenital deformities which are comprehended under the term of *vices of articular conformation*. They should be divided into four groups:

1st. Vices of conformation by ankylosis.

2nd. Vices of conformation by diastasis.

3rd. Vices of conformation by the absence of a part or of the whole of a bone.

4th. Vices of conformation with deviations or luxation.

The three first groups include anomalies against which surgery is powerless, and which it is useless to study here; I shall simply consider the vices of conformation with deviations or luxations.

1st. Vices of the Conformation of the Articulations with Deviations or Luxations.

Before examining the characters belonging to these vices of conformation in the various articulations of the skeleton, I shall rapidly point out the etiology and the pathological physiology of congenital articular anomalies.

Causes.

Numerous theories have been put forward in order to account for articular deformities. If some of these theories are specious, the greater number are founded on facts sanctioned by experience; no one of them is always applicable to all the varied cases which observation reveals to us. I shall first enumerate the causes the action of which has been well authenticated, and I shall then assign to each of these causes the importance due to them according to the present state of our knowledge.

Hereditary transmission should be placed in the first rank in these etiologic considerations on articular difformities; it is exercised from one generation to that which immediately follows it, and in rare instances

to the second. The existence of hereditary vices of conformation finds its explanation in the primordial vicious organization of the germs. *A derangement sustained in the process of formation* may be the cause of some congenital vices of articular conformation; embryology teaches us that in the embryonic state of the skeleton, the number and position of the primary points of ossification are determined long before the period of the formation of the bone itself; if one of these points is wanting, the portion of bone which at a later period should correspond to will also be deficient; if one of these points remains rudimentary, there will be an arrest of development.

Diseases of the fœtus appear to play a prominent part in the vices of articular conformation. There can be no doubt of the influence of articular diseases developed during fœtal life on the congenital deformities of the articulations; there is nothing really unnatural in conceiving that the swelling of the adipose cotyloidean tissue of white swellings, hydrarthosis, appearing in the course of fœtal existence, may lead to congenital luxations of the corresponding articulations. Other fœtal diseases have been cited in order to account for the deformities of the articulations; these are—diseases of the skeleton, contraction of the ligaments or of the aponeuroses; muscular retraction; pressure exercised on the body of the fœtus; the unnatural positions of the fœtus, &c.

Diseases of the skeleton are observed in the trunk and superior and inferior extremities, and may engender various deviations after the expiration of intra-uterine existence.

The *aponeuroses*, by their primary or consecutive shortening, may determine the vicious conformation of certain parts of the fœtus; the same may be said of the primary or consecutive shortening of the *ligaments*, which may produce congenital articular deviations.

The *muscles* are often contracted near the distorted articulations; moreover, the muscles, the length of which is lessened, are especially those whose extremities are approximated in consequence of the change in position of the levers which they should move; this result of anatomical investigation, after having given rise to various theories, appears to us to have received an excellent explanation by M. J. Guérin. This learned physician is of opinion that the principal cause of congenital vices of conformation of the articulations, is the convulsive retraction of the muscles, developed in the fœtus under the influence of a lesion of the nervous system. According to M. J. Guérin, this retraction may affect one or several muscles, it may be seated in the muscles of an entire region, and it may consequently arrest a movement or a series of movements. When retraction exists, the muscular insertions are approximated, the levers moved by the muscles are displaced; thus deviations are produced, pressure of bone against bone, or against their ligaments, luxations and sub-luxations in all their degrees.

Once produced, the muscular retraction continues; at the first stage (contraction, of M. J. Guérin) the muscle is red, firm, of tolerable size; but at length, the disease progressing, the second stage (retraction, M. J. Guérin) shows itself, characterized by the transformation of the muscular fibre into fibrous tissue.

I shall lastly mention as a cause of vicious conformation of the articulations, *pressure exercised on the body of the fœtus, and unnatural positions of the latter;* this cause, to which M. Martin would attach an importance it does not possess, would nevertheless, in certain cases, play an important part in the production of articular anomalies.

To resume, then: although the vices of articular conformation may be produced by various causes, although these deformities sometimes appear without our being able to discover the reason why, we do not hesitate to assert that in the immense majority of cases, lesion of the nervous system, followed by muscular retraction, is the sole cause of congenital vices of the conformation of the articulations.

Pathological Physiology.

Congenital vices in the conformation of the articulations cause remarkable modifications in the functions of locomotion. The articulations lose their normal mobility; but in the greater number of cases, their functions are accomplished in a more or less complete manner. If we examine an articulation attacked with deformity with reference to the paralysed muscles, we observe muscles which have acquired a considerable development and entirely take the place of those which do not exist; around an immoveable joint, we see the nearest articulations acquire more varied movements, and we may easily prove that the performance of isolated movements affords the lame a great dexterity in using the vicious members.

Congenital Vices of Conformation studied in the different Articulations.

These deformities are especially met with in the hands and in the feet, in the tibio-tarsal, and radio-carpal articulations. They are much more frequent in the feet, and to them we shall first direct attention.

Congenital Vices of the Tibio-Tarsal Articulations and of the Bones of the Foot (Club-foot).

Grouped under the generic name of talipes (club-foot) the deviations of the foot are termed: 1st. Talipes equinus; 2nd. Talus; 3rd. Varus; 4th. Valgus.

M. Bonnet, of Lyons, has proposed to reduce the varieties of club-foot to two classes, *internal* and *external popliteal club-foot*, according as the deviations depend on the retraction of the muscles supplied

by the branches of the internal or external popliteal nerve. This classification, however advantageous it may appear to be, not being generally admitted, we shall retain the standard division which has just been given.

Pathological Anatomy.

1*st.* *Talipes equinus.* The foot is in forced extension, and only touches the ground by the toes or by the anterior extremity of the metatarsal bones. The principal movement takes place in the tibio-tarsal articulation. The anterior surface of the astragalus is nearly subcutaneous; its posterior part only touches the articular surfaces of the tibia and fibula. The posterior extremity of the os calcis is raised.

If the talipes equinus exists in its most advanced degree, the foot is bent at the situation of the space which separates the two rows of the tarsus.

The form of the bones is scarcely modified.

The gastrocnemii muscles sometimes undergo fatty degeneration; they are retracted.

2*nd.* *Talus.* The foot is in forced flexion, it only touches the ground by the heel. The greatest movement takes place in the tibio-tarsal articulation. The astragalus is incompletely dislocated backwards. As in talipes equinus, the bones are scarcely deformed; the gastrocnemii, which are subject to fatty degeneration, are elongated.

3*rd.* *Varus.* The displacement takes place in the medio-tarsal articulations; it is characterized by the deviation of the foot inwards, so that it rests upon the ground on its outer edge. The scaphoid bone is drawn inwards, then backwards; its internal extremity articulates with the calcaneum, sometimes with the internal malleolus; the cuboid is drawn backwards and inwards. The astragalus and the calcaneum are displaced in such a manner that the inferior surface of the first becomes internal, and the external surface of the second inferior.

The bones become atrophied in some places, increase in size in others, subject, as in the previous varieties, to fatty degeneration; the gastrocnemii are contracted, the peronei elongated, the tibialis anticus shortened.

4*th.* *Valgus.* The displacement is seated in the medio-tarsal articulations; it is characterized by the deviation of the foot outwards, the internal edge of the foot forming the only point of support. This variety presents the displacement of the bones and the dispositions of the muscles inverse to those of varus. The bones may also become hypertrophied or atrophied.

The various deviations we have just described may be combined together, so as to produce equino-varus, varus-equinus, talus-valgus, &c.

SYMPTOMS.

1*st*. *Talipes equinus*. The foot is extended. The heel is shortened, and elevated. The sole of the foot is very concave and looks backwards; the dorsum convex, looks forwards; the anterior extremity touches the ground. The toes are directed forwards, their dorsal surface is turned upwards in certain cases; in others it rests on the ground. The spreading toes and metatarsal bones increase the size of the anterior part of the foot. The head of the astragalus projects on the dorsum of the foot; the same is the case with the anterior extremity of the os calcis. The posterior muscles of the leg are contracted. Progression is constrained.

2*nd*. *Talus*. Slight deformity; the foot in a state of flexion. The dorsal surface of the foot looks backwards, the plantar surface forwards, the toes upwards, and the heels downwards. The posterior part of the head of the astragalus is felt behind the tibio-tarsal articulation. The anterior muscles of the leg are contracted and shortened. Progression is difficult.

3*rd*. *Varus*. The foot deviates inwards, and is very deformed. The axis of the foot forms with that of the leg a right angle directed inwards. The dorsal surface of the foot looked inwards; concave, its inferior surface is directed backwards. The toes look inwards, the heel, a little raised, has its normal direction. The inner edge of the foot is directed upwards, the external edge rests on the ground. On the dorsal surface of the foot the tibial articular facet and the round head of the astragalus may be felt; on the external edge, the external malleolus and the cuboidean extremity of the calcaneum may be recognized, as they are very projecting. The peronei are elongated, whilst the tibial muscles, the gastrocnemii, the plantar muscles, and aponeurosis are shortened.

This variety of club-foot, slightly developed at birth, often increases in intensity when the infant begins to walk.

4*th*. *Valgus*. The most rare of all the varieties of club-foot. The foot is deviated outwards; the dorsal surface is directed forwards, the plantar surface, less concave, backwards, the external edge upwards, the internal edge, convex, rests on the ground. The tibial muscles are elongated and the peronei shortened.

DIAGNOSIS.

Club-foot cannot be mistaken for any other disease. The surgeon called to a child afflicted with this disease should diagnose the variety of the anomaly presented to him.

PROGNOSIS.

This vice of conformation has no effect on the health of the children

who are attacked by it; it is more or less an impediment to progression. Beyond the resources of art in the adult, it may be often cured in the child.

Treatment.

The treatment applicable to club-foot may be either curative or palliative.

A. *Curative treatment.* The intention of this treatment is to restore to the distorted joint its form and functions, by affording it its normal relations; this aim may be obtained by means of mechanical appliances on the one part, and by means of section of the tendons and of the muscles on the other.

The *mechanical appliances* consist of moveable apparatus, splints, pads, bandages, &c., immoveable apparatus: plaster casts, dextrine bandages, &c. They should be regularly applied in a continuous and gradual manner. In order to obtain good results from them, the surgeon should continue their use, according to the advice of Andry, even to the exaggeration of the normal position of the displaced bones.

The result of mechanical means is to elongate the fibrous and muscular tissues, to modify the form of the bones; they act so much the better in proportion as the subject is younger, and the congenital vice less decided. They may produce acute pains, erysipelas, gangrene, fever, convulsions.

Section of the shortened tendons, muscles, ligaments, and aponeurosis. The subcutaneous method allows the fibrous and muscular tissues to resume their normal length; it is applicable directly after birth and in the first years of existence; it constitutes an operation which is most frequently advantageous.

In those instances where the deformity of the foot is slight, the surgeon should employ mechanical means. If the deformity is considerable, he should fearlessly have recourse to tenotomy. In consequence of the feebleness and irritability of the infant, some surgeons have recommended the operation to be put off until the age of three or four years, a period when the process of dentition is accomplished, and they advise waiting until this time, making use of palliative means. Others operate in the first month after birth, and find good results, for then there is much more facility for the application and the retention of the apparatus used after the operation. Towards three or four years, the children possess an indocility which cannot always be overcome, and if the apparatus is left off, all the good resulting from the operation is lost. For my part, I consider it best to operate in the first two months of existence.

In talipes equinus, the tendo Achilles should be incised; in varus, section of this tendon should also be practised. In talus, the tendons, which pass in front of the tibio-tarsal articulation, should be incised; in valgus, incision of the peronei muscles should be performed. If the foot is in some measure twisted in consequence of the contraction of the plantar aponeurosis, this aponeurosis should also be divided. After the operation, the foot and the leg are maintained in such a position that the two portions of the tendon can only reunite by the interposition of an intermediary tissue which increases its length.

[In club-foot, children may be operated on as early as one month, but it is perhaps best to delay it till the third month. After the division of the tendon, the foot should be kept in its previous position by means of a pad and bandage until about the fifth day, when extension should be commenced and gradually increased, for which purpose Scarpa's shoe answers best; if the extension is delayed as long as a fortnight, the new deposit around the severed tendon may have become quite firm. In severe cases of talipes varus, the foot may be brought straight by the division of the tendons of the inner side of the foot, and after a time the heel may then be brought down by division of the tendo Achilles.—P.H.B.]

Palliative treatment. This consists in preventing the deformity from increasing, by keeping the foot straight with suitable boots, and preventing the children from walking about.

Congenital Vices of Conformation of the Articulations of the Hand (Club-hand).

Much more rare than the deviations of the foot, the congenital vices of the hand may be thus divided: 1st. Club-hand—equinus; 2nd. Club-hand—talus; 3rd. Club-hand—varus; 4th. Club-hand—valgus.

These appropriate designations are thus characterized: the equinus, by the displacement of the wrist backwards, that is to say, by extreme flexion; the talus, by the displacement of the wrist forwards, which produces forced extension. The varus and valgus are recognized by the inclination of the hand in the inverse direction to the displacement.

The surgeon should follow the same principles as for the cure of club-foot; the section of the contracted tendons and aponeuroses should be practised when the child has obtained all its teeth; palliative treatment should be employed until the period when tenotomy should be practised.

Congenital Vices of Conformation of Articulations besides those of the Hand and Foot.

These deformities are rare, the observations which have been recorded are for the most part so incomplete that we shall pass them over in silence.

[The frequency of congenital luxations is much greater than is generally supposed. Since the year 1826, when Dupuytren first directed attention to the subject, 180 cases, in various joints, have been recorded. In the course of eighteen years, Dupuytren met with twenty-six cases. Guérin has observed thirty, Heine had witnessed eleven cases of congenital luxation of the femur, Chelius nine, and Melicher six. Smith, of Dublin, records five cases in the shoulder joint; and Adams and Smith, and Cruveilhier have seen it in the elbow joint.

Of its importance there can be no doubt, for Dupuytren has known many individuals affected with *original* luxation, confined to bed for years, from a mere mistake in the diagnosis.

The luxations may be obstetrical, spontaneous, functional, and original. Obstetrical luxations are those produced by violence during delivery; they are principally observed at the shoulder, elbow, ribs, hip, and ankle. Spontaneous luxations are the consequences of diseases in the fœtus, of which coxalgia and hydrarthrosis appear to be the most frequent causes. *Coxalgia* is generally assigned as a cause of congenital luxation by writers on these complaints. Cases are given by Albers and Ficker where the symptoms of coxalgia were present; but Melicher states that he has not discovered any well authenticated case, where an infant came into the world with a spontaneous luxation, the result of morbus coxarius having reached its latter stage.

Hydrarthosis has been cited as a cause by M. Parise in a memoir on congenital luxation. He examined the joints of 332 new-born infants, and in only three did the congenital luxation arise from an abnormal secretion of synovia.—(*Archiv. Gen. de Med.;* t. xiv, p. 439.)

Hypertrophy of the Haversian gland. Several cases of luxation from this cause have been now recorded in medical science.

Functional luxations are those the true origin of the formation of which is to be found in some cause resident within the organism of the fœtus; they result from muscular irregularities, the dynamic cause of which resides in the nervous system; either in the nervous centres, the brain, or the spinal cord; or the disease exists in some organ of the body implicating the peripheral parts of the nervous system; for instance, some of the abdominal viscera; the incident nerves of which are morbidly affected; these communicate in the spinal cord, with other filaments—the reflex or involuntary motor nerves—whereby the muscles of the deranged part are excited to spasmodic action. There is one variety of this species of luxation which has been rarely noticed, this is called by Melicher *luxatio congenita costarum*, in which the ribs are more or less compressed, the sternum and abdomen projecting, the spine inclining backwards.

Original luxation embraces that particular class wherein is included the most aggravated cases of lameness and distortions; it is most apt to occur in most of the free joints, as in the shoulder, elbow, and wrist, in the hip joint, knee, and ankle.

Original luxation of the hip joint was first accurately explained by Dupuytren (*Repertoire Générale d'Anatomie;* vol. ii), and the most important additions made to the facts stated by him are those collected by Mr. Adams of Dublin. It is

distinguished from all other dislocations, especially from spontaneous dislocation, in that, 1st, it ordinarily occurs in both hips; of nine cases, however, which Chelius has seen, in four the dislocation was only on one side; 2nd, it is not preceded by any symptoms of coxalgia; and 3rd, it is usually first noticed in the first attempts the child makes to learn to walk, and if the attempt be continued, till the movements become wearisome.

Chelius has seen congenital dislocation of the knee cap on both sides in an aged man (*System of Surgery;* vol. i, p. 805), and Paletta has examined (*Exercitationes Patholog.;* p. 91) a case of congenital dislocation of the patella.

Smith *(On Fractures near Joints, &c.)* gives a lucid exposition of the congenital dislocation of the shoulder joint; he details five cases observed in Dublin, three of these were *subcoracoid* and two *subacromial;* of the former, two were in the left shoulder, and one in both; of the latter, one was observed on the left, the other on the right side. That these dislocations are *congenital* and not *of accidental occurrence*, he thinks decided, as regards subcoracoid dislocation, in the absence of previous injury, in the joint not being the seat of pain, swelling, &c., but especially in the perfect condition of the capsule and of the tendon of the biceps, as well as in the simultaneous existence of a *pes equinus* in the same patient; in the form of the head of the humerus being peculiar, and quite different from any change which he has noticed as consequent on disease or in old dislocation of the usual kind.

Some attribute this congenital disease to the position of the fœtus; others to an arrest of development; and a lesion of the nervous centres may be perhaps the remote cause of the deformity in some instances. This opinion is supported by the frequent occurrence of congenital luxations in idiots, and also by the fact of their being so often symmetrical; but it is difficult to believe in the possibility of effecting a permanent cure of the deformity, if we are to recognize a lesion of some parts of the nervous centres as its source in all instances.

Smith details instances of congenital luxation of the right carpus backwards, as well as forwards.

Congenital dislocation of the lower jaw was first noticed by Guérin (*Researches sur les Luxations Congenitales;* 1841) in a fœtus with deficient formation of the brain; and Smith has observed a congenital dislocation of the jaw on the left side, in an idiot from birth, and considered it as consequent on arrested development of the transverse root of the superior maxillary bone or of the articular eminence. "The following are the distinctive characters, referring only to the deformity as existing on one side, for he has never seen an instance of double congenital luxation of the jaw.

1. In the congenital luxation, the mouth can be freely opened and closed; in chronic rheumatism these motions can be performed, but not without uneasiness to the patients, an uneasiness which sometimes amounts to severe pain; in luxation from accident, the mouth cannot be closed.

2. An involuntary flow of saliva accompanies the accidental luxation alone, although in some cases of chronic rheumatism there is an increased secretion of that fluid.

3. In congenital luxations the teeth of the upper jaw project beyond those of the lower; the reverse is observed in accidental luxations and in chronic rheumatism.

4. In congenital luxation there is no fulness in the cheek, such as the coronoid process produces in cases of accidental luxation, and the enlarged condyle in some instances of chronic rheumatic arthritis.

In the treatment of congenital dislocations, frictions and shampooing may be used as palliative remedies, and various mechanical contrivances have been employed

to give firmness to the joint. The reduction of the congenital dislocation of the thigh has been effected by Pravaz *(Annales d'Hygiène Publique)* in a girl and in a boy, both eight years of age. Guérin effected a cure in six cases. To effect this, gradual extension was made use of, followed by violent abduction, assisted by methodical pressure on the great trochanter; Guérin cuts through the muscles which do not lengthen, and even through the ligaments.—P.H.B.]

CHAPTER II.

ON ARTHRITIS AND RHEUMATISM.

Articular inflammations, of whatever nature they may be, are rare in infants and children at the breast. I do not pretend to trace the history of these diseases, in consequence of the insufficiency of cases up to the present time recorded in science. I shall confine myself to the relation of two recent cases which may be added to those which have been published in the Thesis of M. Treilhard de la Terrisse.

Case 1. *Acute poly-articular rheumatism; recovery.* A child, five months old, labouring under otorrhœa without febrile symptoms, became suddenly ill and was successively attacked with acute pains accompanied with swelling, at first in the feet, then in the knees. This pain was increased by pressure and the movements of the limb, as far as could be proved by the cries of the patient; there was no redness of the skin, and the heart remained free and did not present any functional disturbance.

There was no gastric or pulmonary symptom. The fever continued very moderate, the pulse did not rise higher than 130 pulsations.

At the end of eight days the swelling of the feet vanished, and the pain appeared to lessen; but these symptoms continued in the knees for a month. They finally disappeared under the influence of local narcotic and sedative applications, datura stramonium in poultices.

Case 2. *Mono-articular rheumatism; death.* A young child, fifteen days old, was attacked with mono-articular rheumatism of the shoulder.

This disease proved rapidly fatal; it became developed in the midst of very extraordinary circumstances. The mother, recently delivered, fell under the influence of a very serious puerperal epidemic raging at the time; she had puerperal fever with suppurative arthritis of the knee. The child suckled by her fell ill, refused the breast, had diarrhœa with jaundice and fever, its right shoulder appeared to be painful, but without appreciable swelling; movements were impossible, and even pressure with the fingers caused the most acute pain; death resulted at the end of some days. The scapulo-humeral articulation was observed filled with reddish serous pus, the synovial membrane much injected and the bones perfectly intact. With the exception of slight redness in the large intestine, the mucous membrane of which was slightly inflamed, the other organs did not present any change.

Case 3. *Poly-articular rheumatism; suppuration; death.* Child of *the male sex*, four days old; induration of the cellular tissue of the limbs and of the dorsal region. Diarrhœa soon came on, with alteration in the features of the face. The

child admitted 28th of April, died early in May. The right coxo-femoral articulations, the two femoro-tibial, the left tibio-tarsal and the radio-carpal of the same side, are filled with pus. The cartilages are of a dull yellow without any appreciable alteration of their tissue. The skin of the dorsal surface of the radio-carpal articulation presents a red patch.

No abscess in the muscles nor in the lungs, which were simply the seat of a little infiltration (congestion) at their posterior surface and at their base; all the other organs healthy.

Case 4. *Metastatic arthritis.* J. B. Fleury, three days old, was brought to the infirmary, August 20, 1832, having the tongue red at the edges and a diarrhœa of green matters. On the 27th, patches of thrush in the mouth, ulceration of the frænum of the tongue; died on the 29th. Miliary, subpleural, purulent collections, surrounded by a bluish areola, scattered here and there on the surface of the lungs; the right coxo-femoral, and femoro-tibial articulations contain a reddish purulent synovia; the synovial membrane is red, the cartilages of a dull yellow colour. The right scapulo-humeral articulation contains a sero-purulent liquid, and the left true pus. Purulent collection between the biceps, coraco-brachialis, and deltoid muscles; the cephalic vein which traverses this collection is red and thickened. Encysted abscess near the left wrist; nothing remarkable in the brain and its appendages; bladder excessively distended by urine.

Case 5. *Metastatic arthritis.* A twin child, of the male sex, six days old, was brought, September 16th, 1832, to the infirmary, and presented the following symptoms: tongue red at the edges with projection of the papillæ, greenish diarrhœa, induration of the cellular tissue of the back. The improvement in the state of this child is such that on the 18th he is given to the charge of the sedentary nurses. On the 27th of the same month he was readmitted into the infirmary, with intense redness of the buccal mucous membrane, which was sprinkled with patches of thrush; the greenish diarrhœa had reappeared, and the marasmus had become decided. These symptoms became worse, and the child died October 17th. Extreme emaciation, eschar on the sacrum with denudation of the bones. Circular ulceration at the extreme part of the left elbow, the base of which communicates with the articulation; cartilages of a yellowish tint. The inferior epiphysis of the humerus is detached from the bone. Collection of pus under the scapular and the great dorsal muscle; the serratus magnus and the subscapular muscles are destroyed. The veins present no traces of inflammation; left femora-tibial articulation contains pus; the cartilages are healthy. The right coxo-femoral articulation communicates by means of a fistulous canal with a purulent collection, which existed in the iliac fossa of the same side; the psoas and iliac muscles are destroyed; the brain and its appendages healthy; lungs congested at their posterior part; thymus transformed into a pouch filled with pus. Thrush of the mouth and of the œsophagus, partial softening of the stomach; friability of the mucous membrane in the upper part of the small intestine; swelling of Peyer's glands; bladder distended by a large quantity of urine.

The above are cases which cannot be yet grouped together in a precise manner; and if it is necessary for me to state my opinion, I should refer the first three to acute articular rheumatism, and the others to metastatic arthritis which is so frequently observed in cases of purulent absorption. It is better to wait for fresh observations in order to clear up this point.

BOOK XXIV.

ON DISEASES OF THE FINGERS.

1st. On Adhesion of the Fingers.

The congenital adhesion of one or several of the fingers or toes is sometimes observed in the newly-born. A serious deformity of the hand results, which we must attempt to remedy. In the foot it is not of so much importance, and it may be let alone.

The adhesions of the fingers are either bony or fleshy. The fleshy adhesions are the most frequent; they involve one or several fingers, a portion or the whole of the interdigital space. The fleshy adhesions should be divided with a bistoury or with scissors. In the case of osseous adhesions, the skin is to be first divided with a bistoury, and then the separation finished with a small saw.

But the most important step is the consecutive dressing. It should be carefully attended to in order to avoid the reproduction of the adhesion. The fingers should be isolated by means of lint spread with Goulard's ointment; and then small compresses, applied at the angle of the separation of the fingers, extending on the back and palm of the hand, fixed to the wrist by a bandage, prevent cicatrization taking place in an unfavourable manner.

2nd. On Supernumerary Fingers.

Incomplete, malformed fingers, often exist regularly or irregularly superadded to the other fingers of the hand. It is especially on the ulnar edge of the hand that this deformity is met with. It is less frequently observed on the side of the thumb.

These fingers are sometimes placed on the same row as the others, attached to an isolated metacarpal bone; or, on the contrary, they are out of line and adhere to the phalanges or to the neighbouring metacarpal bones.

Well-formed supernumerary fingers, placed on the same line as the others, should be respected. Irregularly placed, incomplete fingers, require an immediate extirpation very soon after birth. This operation may be practised with a bistoury. By means of a semicircular incision

of the skin, at the base of the finger to be removed, the articulation is opened, and after having dislocated the appendix, the operation is finished by forming a small flap sufficient to cover the wound. The parts are to be brought into apposition by adhesive plaster, and the whole covered with lint and a bandage. At the end of three days the wound is cicatrized, and no bad symptom ever complicates this operation.

3rd. On Digital Nodes.

I apply the term of *digital nodes* to chronic swellings so frequent on the fingers and toes of young children.

The nodes exist, either around the articulations or around the phalanges. The fingers are swollen, spindle-shaped; the skin is red, livid, and cold. The cellular tissue and the fibrous tissue are indurated. An indolent grey ulceration often exists on the swelling, and continues an indefinite time without enlarging or deepening. The bones and the articulations remain in a state of perfect integrity.

These swellings result from chilblains, or from contusions or wounds of the fingers; but there is a general cause, the existence of which must not be overlooked, and which presides over their development. This cause is scrofula. Digital nodes are only, in my opinion, a form of cutaneous scrofulous affection.

Digital nodes have often been mistaken for white swellings of the fingers and caries of the phalanges. This is an error. In most of the cases neither the bone nor the articulations are diseased, and the amputated fingers only present simple swelling of the periosteum and of the surrounding cellular tissue.

The nodes remain a very long time, but are easily cured if the bones or the articulations do not become inflamed.

Antiscorbutics and antiscrofulous medicines internally, iodurated ointments externally, local and general saline baths, counter-irritation with a heated button of iron, generous living, exercise, and country air, suffice to cure this disease.

BOOK XXV.

ON GROWTH IN ITS RELATIONS WITH THE DISEASES OF CHILDREN.

The growth of man is the result of the same impulse as that which has given him existence. It is a phenomenon which is necessarily accomplished, and which an unknown force sustains and directs towards a determinate end.

Engendered by sexual intercourse, this force suddenly takes possession of the cell which constitutes the human germ, and will only quit it on the day of its entire development in humanity. It exists before its effect like all the forces of nature, and it varies according to race, seasons, air, and locality. Matter servilely obeys it, as long as no other force happens to disturb it. Then, lessened or neutralized in its action, the development of man suffers from it, that which should be on the right side is observed on the left, white becomes changed to black, that which should be straight is transverse, separated parts coalesce, and those which should be united, on the contrary, remain separate. From the least apparent deformity, to the most complete disturbances of development and of growth, all is possible when the force which directs them happens to be obstructed in its impulse.

After nine months intra-uterine operation, this force is outwardly transmitted with the infant; it continues its work, in the air and light, in the midst of new and varied agents, having from this time forward for an auxillary, the power of a new alimentation, until then unknown.

At this period, the body is finished as regards its outline and its totality, vices of conformation are no longer to be dreaded, growth should henceforth be effected in length and in breadth, and that according to laws as yet little known, but which it would be an important matter to discover.

M. de Buffon is the first who has prepared the way, and he has left a magnificent testimony of it in his account of the growth of a well proportioned young man. Quetelet has followed the example of

our great naturalist, and by numerous calculations, judiciously made, in his work of pure statistic, has nearly elucidated the law of physiologic growth from birth to puberty. Physicians might have seized upon these facts in order to investigate them, or to elucidate pathology, but with the exception of some rare works, amongst which I may cite those of Duchamp and Richard (of Nancy), science has remained silent on this point.

The growth of man, although very variable and impeded by numerous influences, such as temperature, locality, regimen, mode of life, disease, fever, &c., is, notwithstanding, accomplished in a tolerably regular manner, as I am about to demonstrate from tables borrowed from Quetelet.* I shall afterwards investigate the influence of diseases on the growth, and, *vice versâ*, the influence of growth on the development of diseases.

Thus—1st. On growth in the physiological state.

2nd. On the influence of diseases on growth.

3rd. On the influence of growth on the development of diseases.

1st. On Growth in the Physiological State.

Quetelet made his observations and published his statistical tables in Belgium. It is useless to say, however, that we should not rigorously conclude from the results at Brussels, the existence of similar results at Paris, or in every other place. *Hæc scripsi sub sole romano*, exclaimed Baglivi, in addressing his readers; he was right, and here, in less decided terms, we say the same thing, in order that we should not draw too absolute conclusions from researches which may only be approximative, if they are verified amongst us.

Fifty male children were measured at the time of birth; they may be arranged in the following manner:†

	Boys.	Girls.	Total.
Children from 16 to 17 inches . .	2	4	6
„ „ 17 to 18 „ . .	8	19	27
„ „ 18 to 19 „ . .	28	18	46
„ „ 19 to 20 „ . .	12	8	20
„ „ 20 to 21 „ . .	„	1	1
	50	50	100

	Boys.	Girls.
Maximum . .	19 inches, 8 lines.	20 inches, 6 lines.
Minimum . .	16 „ 2 „	16 „ 2 „
Mean . .	18 „ $5\frac{3}{5}$ „	18 „ $1\frac{4}{5}$ „

Which gives 1.639 feet for the boys.
1.6058 feet for the girls.

* *Annales d' hygiene publique*; Paris, 1831; t. vi, p. 89.

† The French pouce or inch equals $1\frac{1}{8}$ inch English.

The same difference exists in the succeeding ages, as may be observed in the following table, made by MM. Delemer, Feigniaux, Guiette, and Van Essch:*

	Boys.	Girls.	Difference.
1 day . . .	0.500	0.490	0.010
1 year . . .	0.698	„	„
2 years . . .	0.796	0.780	0.016
3 „ . . .	0.867	0.853	0.014
4 „ . . .	0.930	0.913	0.017
5 „ . . .	0.986	0.987	0.008
6 „ . . .	1.045	1.035	0.010
7 „ . . .	„	1.091	„
8 „ . . .	1.160	1.154	0.006
9 „ . . .	1.221	1.205	0.016
10 „ . . .	1.280	1.256	0.024
11 „ . . .	1.334	1.286	0.048
12 „ . . .	1.384	1.340	0.044
13 „ . . .	1.431	1.417	0.014
14 „ . . .	1.489	1.475	0.014
15 „ . . .	1.549	1.496	0.053
16 „ . . .	1.600	1.518	0.082
17 „ . . .	1.640	1.553	0.087
18 „ . . .	„	1.564	„
19 „ . . .	1.665	1.570	0.095
20 „ . . .	„	1.574	„
Growth finished .	1.684	1.579	0.105

At the sixteenth or seventeenth year, the growth of the girls is then *relatively* nearly as much advanced as that of young men at eighteen or nineteen years; and it is also observed that from five to fifteen years the growth is fifty-two millimeters for them, whilst it is fifty-six millimeters for the boys.

M. Quetelet has founded the law of growth of the inhabitants of Brussels from his calculations.

1st. The most rapid growth takes place immediately after birth; the child in the space of a year increases about 7.8 inches.

2nd. The growth of the child diminishes in proportion as his age increases nearly towards the age of four or five years, a period at which he attains the *maximum* of probable existence; thus, during the second year following birth, the growth is only half what it was the first, and during the third year, about one third only.

3rd. After the fourth or fifth year, the growth in height becomes nearly regular until towards the sixteenth year, that is to say, towards the age of puberty, and the annual growth is about 2.18 inches.

4th. After the age of puberty, the height still continues to increase, but very slightly; thus, from the sixteenth to the seventeenth year it

* I have abstained from reducing these fractional parts of the French meter into English measures: the French meter is equal to 3.28 feet English.

increases 1.56 inches; in the two following years it increases only .97 inch.

5th. The complete growth of man does not appear to be yet completed at the twenty-fifth year.

It is by thus studying growth in the inhabitants of cities and of the rural districts that he has observed the height of the citizen exceed that of the peasant. On this head Quetelet confirms the results of Villermé,* expressed in these words:

The stature of men becomes more lofty and their growth is attained more quickly, *cæteris paribus*, in proportion as the country is rich and easy circumstances general; as the habitation, clothing, and especially the nourishment are better, and the troubles, fatigues, privations, experienced in infancy and youth are less. In other terms, misery—that is, the circumstances which accompany it—produces stunted stature and retards the period of the complete development of the body.

Growth usually terminates at the nineteenth or twentieth year; it is sometimes prolonged to the twenty-fifth year.

It is modified by locality as well as by climate. The development of the stature terminates more quickly in very hot and in very cold countries than in the more temperate climes; in low countries than on high mountains where the climate is more rigorous. It is also said that the mode of life has a further influence on growth, and that individuals have acquired a considerable development in height after having changed their mode of life and made use of different food.

Other researches on the particular growth of different parts of the body have been undertaken by Joerg, Tenon,† Wenzel, and Richard (of Nancy). They have elucidated results sufficiently curious to merit a place in this chapter.

Increase of the Head.

From one day to one year	longitudinal diameter	. .	$4\frac{1}{2}$ to $5\frac{1}{2}$ inches.
„ „	transverse „	. .	$3\frac{1}{2}$ to 5 inches.
„ „	oblique „	. .	5 to 6 inches.
At the seventh year	longitudinal „	. .	6 inches 4 lines.
„	transverse „	. .	5 inches.

Length of the Trunk.

From one day to nine months . . . . . 8 to 13 or 14 inches.

Length of the Chest from the Sternum to the Pit of the Stomach.

At one day	$2\frac{1}{2}$ inches.
At nine months	3 „
From two to four years	4 „
From four to seven years	5 „

* *Mémoire sur la taille de l'homme en France. Annales d'hygiene;* Paris, 1829; t. i, p. 351.

† *Annales d'hygiene*, 1833; t. x, p. 27.

CIRCUMFERENCE OF THE CHEST AT ITS BASE.

At one day	13	inches.
At one year	17	„
At five years	19	„
At seven years	20	„

LENGTH OF THE ABDOMEN.

At one day	4	inches.
At one year	6	„
At two years	7	„
At four years	8	„
At six years	9	„
At seven years	9½	„

INCREASE OF THE UPPER EXTREMITIES.

From one day to nine months	from 8 to 11 inches.
At the seventh year	18 inches.

INCREASE OF THF LOWER EXTREMITIES.

From one day to nine months	from 8 to 12 inches.
At the seventh year	19 inches.

These interesting figures give an approximative idea of the development of the head, trunk, and limbs during the first years of existence. For want of every other document they will serve as the appropriate measure to guide the practitioner in his appreciation of the partial modifications of growth caused by different diseases.

2ND. OF THE INFLUENCE OF DISEASES ON GROWTH.

Some diseases, small in number, arrest the development of the stature; others, on the contrary, increase it in a very remarkable manner. Care must be taken not to assume the modifications of the stature about to be described for arrest of growth.

The arrest or the diminution of the height is either apparent or real. Thus, in the curvature occasioned by great fatigue a temporary diminution of the stature is constantly observed, which is the result of the fatigue, and which disappears after rest. A young man may in this manner lose from .39 inch to 1.56 inch in height. Conscripts often make use of this ruse to escape enlistment; they walk and run about without resting, the evening before and the morning on which they are to be measured, and those whose height approaches the lower limits fixed by the law, having lost .39 or .78 inch, are declared unfit for service. Buffon has related the most extraordinary case of this kind. It was observed by Gueneau de Montbelliard on his son, the same whose growth Buffon has reported in his table. This young man, five feet nine inches in height, after having passed the evening at a ball, lost eighteen full lines of his height, and was only five feet seven inches six small

lines, a very considerable diminution which twenty-four hours rest caused to disappear.

The real arrest of growth is the result of a single disease, seated in the blood, and which is termed *rachitis*. The fact is indicated, after the example of olden writers, by saying that a child is rickety; this is even the vulgar term for disturbances of growth.

In this disease, or rather in this condition of the blood caused by an inappropriate regimen, the bones are very considerably affected in their molecular nutrition, insufficient to support the weight of the body, softened and painful, their tissue is altered, and becomes less compact, they become curved and crushed, until the general state having disappeared, fresh osseous layers developed externally and internally, sustain and consolidate them.

During this period the increase in length is nearly entirely suspended; from 2.73 to seven inches, which it should be in one year, it is reduced to .78 inch, 1.17 inch at the most; the evolution of the teeth is observed to be interrupted; the bones of the cranium, instead of joining together, appear to separate, the fontanelles continue unclosed, and the head assumes, in some degree, the form of an hydrocephalic one. The vertebral column inclines forwards, and forms behind a sort of dorso-lumbar projection. The chest becomes deformed and flattened laterally to receive the impression of the arms. The articulations, lastly, increase in size in consequence of the swelling of the spongy articular extremities, whence the *knots* of the limbs and the term of *knotty (noueure)* which I have applied to this disease.

I have measured many children attacked with this disease in various stages, and I have been enabled to convince myself of its unfavourable influence over the development of the body.

Of twenty boys, from one to two years, labouring under rachitis, the mean of the height was only 2.4 feet, which establishes a difference of more than 2.3 inches below the usual mean, which is 2.63 feet.

Of twelve girls, also aged from one to two years, the mean height was found to be 2.35 feet, that is to say, nearly 2.73 inches below the usual mean of 2.55 feet.

Of eight boys, from two to three years of age, the mean was observed to be 2.7 feet, 1.56 inches below the physiological mean; and of five girls, of the same age, 2.686 feet, the normal mean being 2.797 feet.

These interesting results should not be considered in their absolute signification, but in their approximative expression, since these are the means, that is to say, abstractions, deduced from a rather limited number of cases.

They simply demonstrate that rachitis temporarily arrests growth; but for how long a time can it continue to act, and how should it reduce the proportions of the body? This is what I have not yet been able to determine, having been unable to follow up the patients a sufficiently long time. When the disease is not very decided, and a change of regimen seasonably neutralises it, the children rapidly become straight, they shoot up in height, and soon regain what was wanting. If, on the contrary, from want of attention and discernment, the rachitis has made great ravages, recovery is more tardy, the growth is for a long time impeded, and we every day observe children who preserve, and who will always preserve, more or less evident traces of their old disease. They are short, squat, the head large, the chin projecting forwards, the limbs a little too thick, or rather, they are deformed, the head sunk in shoulders, which are disproportionately enlarged, the trunk stunted, and the limbs twisted on themselves.

By the side of the influence of rachitis on growth should be placed the influence of the inappropriate alimentary regimen of children, which, without evidently producing rachitic alterations of the bones, alters, however, the general nutrition, and may arrest the development of the stature. An exclusive animal regimen, which is a cause of rachitis in children, is sufficient, it is said, to impede growth, and Quetelet observes, that by means of a simple modification of the regimen, and by the substitution of milk food for the premature use of meat, the stature has been observed to assume a considerable development. Facts of this kind have not fallen under my observation, but they do not appear to me impossible, and are nowise incompatible with the knowledge acquired on the cause and effects of rachitis.

Certain local scrofulous diseases act on the local growth of the parts which give them support. Angular curvature of the spine *(Pott's disease)*, besides the loss of substance which it occasions to certain vertebræ, is also injurious to the development of the rest of the vertebral column. All the white swellings of young children arrest, for a greater or less length of time, the development of the affected limb; but these are only details of the great question we are now considering, and on which it is not necessary to dwell any longer.

There is then only one disease susceptible of hindering and of arresting the general growth of children, this is rachitis. There are, on the contrary, a great number of others which act in an inverse sense and which quicken it in a manner which is sometimes very astonishing. These are fevers, acute diseases, and eclampsia.

We must always be careful not to be deceived in the estimate of

the real growth of children during the continuance of diseases. There is one cause of error that has not, up to the present time, been pointed out, which my researches have permitted me to discern and which might easily lead one to consider as *real*, a growth entirely apparent. For instance, a child is measured on the day on which it falls ill, it is measured fifteen days afterwards, when it gets up for the first time, and it is found, we will suppose, that it has increased 1.17 inch; the next day this is reduced to .78 inch and the day after to .39 only which remains as a permanent addition to the height. This last figure expresses the *real growth* of the child, whilst the other only indicates its *apparent growth*, which I attribute to the swelling of the inter-vertebral and inter-articular cartilages by the simple fact of rest in bed. We must not then assume, as the expression of the real growth of children, the difference of the height which is observed on the first day of getting up; we must allow three or four days to pass in order to obtain the exact amount of growth.

Having pointed out how many mistakes a superficial examination may lead to, let us see what is the true influence of febrile diseases on the elongation of the body.

My observations have been made on children labouring under eclampsia, meningitis, pseudo-meningitis, hooping cough, pneumonia, measles, and scarlatina.

1*st*. *Eclampsia*. A boy three years old twenty teeth, of general good health, and fine constitution, was suddenly seized with an attack of eclampsia coming on without any appreciable cause. I was called, and on measuring him found he was 33.3 inches in height. The attack of eclampsia lasted thirty-six hours and terminated in death. The height was increased .78 inch, he measured 34.1 inches; in deducting more than .39 inch for what I term the apparent growth, there still remains from .27 to .39 inch real growth in thirty-six hours, which appears to me enormous.

2*nd*. *Eclampsia*. A girl four years old was measured by her parents, and the height marked on a panel of the apartment at 35.88 inches. The same evening after an attack of indigestion she vomited and ejected a lumbricus, she had a rather strong convulsion, which lasted until the night; she remained three days in bed and then rose convalescent, and measured 36.46 inches, that is to say .58 inch more than before the attack. Two days afterwards she measured 36.27 inches, and at the end of eight days 36.07 which remained unaltered. This then makes a reduction of .39 inch for the apparent growth due to the rest, and .19 inch of real growth in three days in consequence of a convulsion.

Pseudo-meningitis. Under this denomination I rank those acute diseases of infancy which completely simulate the commencement of meningitis, which are treated like them, and which are cured without having presented anything but the febrile nervous and intestinal phenomena of meningitis.

The little daughter of the physician of Seine-Port, four years old, presented the precursory symptoms of meningitis; loss of spirits, sudden frights, frequent crying, disturbed sleep, loss of appetite, vomiting, constipation, and lastly after eight or ten days intense fever which no evident lesion could explain. I treated

the case as one of meningitis, by leeches to the ears and small doses of calomel. The grandfather of the child also attended, and without previously consulting with me, took a similar view of the case. The child was cured in fifteen days. I had measured the child at the commencement of the symptoms, she measured 35.88 inches. On the first day of getting up she measured 37.44 inches, which became reduced in the following days to 37.05 inches, 36.66 inches, and permanently to 36.27 inches.

In fifteen days she had then acquired an apparent growth of 1.17 inch, while the real growth was only .39 inch.

Meningitis. In many cases of meningitis terminating in death I could prove a lengthening of .78 to 1.17 inch in the children, but not being able in these cases to make the reduction necessarily occurring in the subjects who are cured and who walk, I merely mention these cases.

There is one of them, however, which I shall briefly relate without attaching much importance to it, because it did not come under my own particular attention and I cannot guarantee its entire correctness.

Marie Alavaine, a girl twenty years of age, accidentally deaf and dumb, very intelligent and very skilful with the needle, had cerebral fever at the age of seven years. She spoke and heard perfectly previous to this disease. On her recovery at the end of fifteen days, she had, according to her parents, increased the size of the head half as large again, that is to say from 3.9 to 4.68 inches; she was dumb, and progressively afterwards became deaf.

Hooping cough. A little girl, six years old, labouring under hooping cough, had passed the first week without being very much fatigued with the cough, but in the convulsive stage, fever supervened and confined the patient to her bed for three days. On the first day of the child's getting up, her height was increased .58 inch.

Pneumonia. Measles. Scarlatina. I could here relate many observations analogous to the preceding relative to the development of the height in the course of these three acute diseases. I shall merely state that these facts present nothing special, and that they all possessed, in different degrees, this same phenomenon of growth of the body ulteriorly reduced two-thirds in convalescence.

Although these observations are not sufficient, and are especially not numerous enough to indicate the relation of growth and acute infantile diseases, they nevertheless furnish certain information on some points, and might, I think, serve as a starting point for future researches.

To resume, then: under the influence of eclampsia, the simple febrile state, and some acute diseases, the growth of children appears considerable, and the increase of the height extends to .39, 1.17, or 1.56 of an inch.

This growth is apparent; for during convalescence and under the influence of sports, walking, and fatigue, the height becomes diminished again, loses .39 or .78 inch, so as to reduce by two thirds the elongation acquired during the repose consequent upon the disease.

The real increase of the height of children during their acute diseases, should then be estimated at nearly the third of their apparent elongation.

3rd. Influence of Growth on Diseases.

A tradition of some weight, belonging to a period of distant date of which M. Richard of Nancy has become the interpreter,* teaches us the numerous individual varieties of more or less rapid growth, and the derangements of the organism thence resulting.

When the stature increases rapidly, the children are thin, their flesh is soft, and their muscles without firmness; they are quickly fatigued, soon become curved. The frequent necessity for rest engenders listlessness, and renders sleep more necessary, longer, and more complete.

The articulations are frequently painful, and their movement sometimes accompanied by a slight grating sound. The sphincters are lax, whence sometimes result, in cases of imperative necessity, involuntary escape of fæcal and urinary matters.

The intellectual faculties are slightly retarded, and the children preserve longer than others the taste for puerilities beneath their age.

The impulse of growth is rarely accompanied by fever. There are, however, circumstances in which, in the absence of all possible localization of a febrile state, and in face of an exaggerated growth, we may ask ourselves if there is not some relation between this growth and this fever.

I have met with many difficulties of this kind, and it has not been always possible for me to decide the question. The following is one of these cases:

A child, twenty-five months old, 31.2 inches high, suckled by its mother, of general good health from its birth, having only ten teeth; four inferior incisor, two median superior incisor, and four first molars, began to walk at thirteen months.

For six weeks it has been ailing, has had a remittent fever which cannot be localized. The child is emaciated, sad, and depressed; it scarcely eats and drinks freely. The tongue is furred, digestion very good; it has had neither vomitings nor diarrhœa.

No derangements exist in the functions of the chest and of the head.

The child will not and cannot walk, although there is no pain in the limbs on pressure. The bones are not softened, the vertebral column is straight, there is no rachitis.

In six weeks the child has grown from 31.20 inches to 32.76 inches.

Is the exaggerated impulse of growth the cause of this febrile condition which I have been unable to localize, or, on the contrary, is the fever, in relation with a retardation of dentition in the child, that which has determined this lengthening of the stature? It is impossible to say. Each of these opinions might be defended, but the truth remains to be discovered. The question has continued unresolved in my mind.

There is only one general fact which appears to me to accompany the too rapid increase of stature, this is the more or less decided

* *Traité des maladies des enfants.*

enervation of the muscular system, especially that of the lower limbs. This enervation may amount to complete paraplegia.

It is known that all children grow very much during the course of acute diseases, and whoever has observed them in their convalescence, has remarked them to be feeble, tottering, more unsteady on their feet than ever; a similar case is not observed in the adult. This is a common occurrence. In the former this state lasts a considerable time, and the longer in proportion as the growth has been greater, and as the muscles of the legs and of the thighs have not resumed their primitive vigour. It is a remarkable circumstance that this weakness, which at first exists universally, continues in the muscles of the inferior extremities while it has for a long time disappeared from the upper extremities. I have observed children remain thus several months before recovering the complete use of their limbs, and in an adult whose growth was backward, I have observed the power of motion, for ever abolished, characterize a true paraplegia.

It was in 1844, in St. Michael's ward, No. 42, in the practice of M. Rayer.

A man, twenty-one years old, summoned by the law of conscription, presented himself at the drawing of lots, and was one of the selected. He was examined by the revising court, and sent back in consequence of his height, then fixed at 4.8 feet, a figure 3.9 inches lower than the minimum required by the law. He was then declared exempt from military service in the month of March, when he fell slightly ill without being able to assign any cause. He grew much, and his lower limbs getting daily heavier, soon became immoveable. He was paraplegic.

Disheartened at not getting well, he quitted his province at the end of six months in order to come up to Paris. He then procured a passport which described his height at the time of his departure. This man was then 5.2 feet, which established a difference of 4.8 inches with the measure taken by the military authorities. He had then, at the twenty-first year, grown nearly four inches in six months, and during this time he became paraplegic.

I own, for my part, without the marvellous chance of the result of the examination at the conscription, and of a passport which was afterwards produced, that is to say, without the existence of two authentic documents made at six months' interval, and which showed the reality of this tardy growth, I could never have believed it; and if I have published all these details, it is in order to prove that I have not been the dupe of any mystification.

This patient continued several months under treatment without experiencing improvement, and at the concours of the central bureau of the hospitals, he was the subject of a lecture which was very incomplete since it was not elucidated by the valuable information to which I have referred.

For my part, if I may be permitted to hazard an opinion in this extraordinary and difficult case, I may state that I attribute the paraplegia to the exaggerated tardy growth of this young man, and I

may, with much hesitation, add this other hypothesis, that his inferior limbs, in growing, had distended or lacerated the spinal cord and the nerves which issue from it.

The growth is not always accomplished in a regular manner in the totality of the length of the body, it is sometimes more exclusively developed in one of its parts; the *chest*, the *head*, or the *upper* and *lower extremities*.

M. Richard of Nancy has clearly pointed out the characters of these partial abnormal instances of increase, and their influence on the health of individuals.

"The *chest* in children has not the conformation of that of the adult. Its perpendicular diameter is smaller, its antero-posterior diameter is greater, all proportion being preserved; in a word, the cone to which it is usual to compare the thorax, has a smaller axis and a larger base.

"The reason of this disposition is discovered in the immense development of the abdomen of the child, which contains a digestive apparatus at the same time suitable to the necessities of nutrition and of growth.

"The thorax, diminished in its vertical diameter, should then increase from before backwards, so as to lodge the heart, which is of great size, in the fœtus and the thymus, which does not exist in the adult. Thus the sternum is considerably inclined from above downwards and from behind forwards, so that the ensiform cartilage is very distant from the vertebral column.

"In proportion as the subject grows, it is especially in the dorsal portion of the vertebral column that the process of elongation is observed, for the reason that this part itself alone comprises half of all the vertebræ; in order that the harmony should not be disturbed, it is necessary that the transverse dimensions increase at the same time, and it is this double process which is often difficult.

"When the individual grows too rapidly, the process of elongation necessarily involves it; the transverse movement is suspended or diminished.

"Whatever may be the period of life at which this too precipitate impulse takes place, every other development is arrested. The second dentition is retarded and disturbed; at a later period the phenomena of puberty are those which are modified, the catamenia do not appear or disappear after having already occasionally shown themselves.

"If the growth exceeds certain limits, the heart and the lungs are inconvenienced in too narrow a chest, and more serious derangement of the health may result from it. This is probably the origin of a certain number of diseases of the heart, or of some tubercular pulmonary diseases."

In 1851, a young girl, twenty-one years old, was admitted into La Charité under M. Andral, whom I had the honour to replace, with an affection of the heart developed in the following conditions of tardy growth:

She was born of an epileptic father and of a mother of good constitution, both still living. She was suckled by her mother at Paris, and walked at one year old. She was then taken into the country to some poor people, where she was imperfectly nourished, and at three years old she could no longer walk. She was rachitic, and this attack of rachitis lasted more than a year. When she could walk again, she was not deformed, was only feeble, and very small.

After the age of twelve years she acquired the habit of masturbation. This young girl has always been suffering, small, and emaciated. At fourteen years she had still the height of a girl of six or seven years, namely, 40.54 to 42.88 inches.

She then commenced to increase in size, when she fell ill and remained in bed for eighteen months. During this time her height became much increased, and she had palpitations, hæmoptysis, anasarca. She finally recovered and left the bed towards the sixteenth year of her age, almost of the same size as she now is, that is to say, 60.43 inches, which nearly gives a difference of twenty inches.

Making allowance for the habitual exaggeration of patients, and reducing by half the growth of this young girl from the age of fourteen to sixteen years, there still remains a growth of ten inches to be registered, which is enormous at this age.

The catamenia did not appear until after this increase of stature, and since then they have never appeared regularly, they have always more or less followed the use of emmenagogues administered with the intention of ensuring their regularity. The genital parts were consecutively the seat of a constant leucorrhœa.

The health has never been entirely reëstablished; a fresh and abundant hæmoptysis took place two months since, without being followed by unfavourable symptoms.

This young girl entered the hospital for the vaginitis, and not for the disease of the heart. It was on examination that we made this discovery and formed the following triple diagnosis: vaginitis; narrowing of the orifice of the aorta with a very decided chloro-anæmic condition.

It would be absurd to look upon the tardy growth of this young girl, whose history has just been reported, as the *certain cause* of the organic lesion of the heart discovered in her; this would be a premature induction. Quite the contrary may be the case. In fact, there is no proof that the child, primarily attacked by endocarditis, was not kept to her bed for two years, and that, under the influence of this disease and rest, the stature, retarded at its commencement, only acquired the dimensions which we have just stated. There is nothing to prove this, but also nothing to establish it, and, consequently, we do not see what may hinder our belief, to a certain extent, in the possible influence of exaggerated growth on the development of the organic alteration of the heart. For my part, I, at present, only see a coincidence, and I leave to the future the work of clearing up the subject under discussion by means of fresh observations.

M. Richard (of Nancy) has published, in too brief a manner, an observation which presents an analogy with the preceding, but which

I cannot make of much service here for want of details—it is as follows:

A member of La Charité, of Lyons, from sixteen to seventeen years, increased *several inches* in the very short space of *two months*.

During this period, hæmoptysis, cough, and emaciation combined, lead to the fear of pulmonary consumption. Auscultation, however, did not indicate any tubercular lesion, and the lung was permeable throughout.

After some interval of rest, the use of asses milk, mucilaginous drinks, and afterwards the addition of a generous animal diet, this young man recovered; but, I repeat, this observation is wanting in the greater part of the details essentially necessary to make any conclusion important. I look upon it as an instance of rapid and considerable growth at an advanced age.

Neither is it impossible that under the influence of the rapid growth of the body, and of the considerable constriction of the chest which is the consequence of it, the lungs, compressed, inconvenienced, impeded in their functions, insufficient for a powerful hæmatosis, may not become the seat of tubercular disease. In fact, we see so many individuals prematurely tall, whose chest is narrow and ill developed, who ultimately become tuberculous, that we may demand, without wronging our judgment, if the rapid increase is in them the cause, or, on the contrary, the effect of the approaching disease. In some rare instances, there can be no doubt on this point; in individuals born of healthy parents, and whom a rapid growth has made prematurely tall, weakness, palpitations, and tubercles, should be referred to this exaggerated impulse of growth.

Another variety of partial abnormal growth is that which is seated in the upper extremities, and which is recognized by the length and size of the arms in individuals of small stature, or by the dimensions of the haunches and the disproportionate extent of the thighs and legs, as well as their thinness, in certain men of tall stature. These facts possess only a trifling importance in pathology, and we think it is unnecessary to occupy the attention except by this simple mention of them.

Conclusions.

Vainly do we raise the imagination to the extent of the conception of the powers of the human growth, we must always descend to the observation of its phenomena, to reascend, if it is possible, to the laws which govern them. Thus have I proceeded. The numerous facts I have related have led me to the discovery, measure in hand, of the mean height of children at different ages in both sexes. I have estimated the influence of diseases on the *apparent growth* of children and their influence on the *real growth*. Lastly, I have finished by the investigation of the influence of too rapid and too exaggerated a

growth on the development of the strength of the muscular system, of paraplegia, and of the functions of respiration and circulation.

It now remains for me to complete these last considerations by the exposition of the rules of hygiene and therapeutics, which appear to me to be proper in similar circumstances.

In children who do not grow, we may, with the exception of special hereditary instances, believe in the existence of rachitis, or the commencement of this disease, and we should change the regimen and the mode of living of the subjects. They should be placed under the exclusive use of milk in all its forms, suppressing meat, vegetables, and wine, and they should be sent to live in the country. If the rachitis is clearly characterized, it is proper to have recourse to salt water baths, and cod liver oil in varying doses, according to the age and susceptibility of the children.

In the case of too rapid exaggerated growth, we should, on the contrary, diminish the quantity of milk and watery food, in order to habituate the stomach as much as possible to the use of a more decided animal regimen. Daily cold effusion over the body should be prescribed, and, in summer, cold baths frequently repeated. Running and walking are very necessary, and it is of so much more importance to have recourse to these exercises, as it is known fatigue occasions the temporary sinking of the vertebral column. Long continued walking with a weight on the head constitutes the most useful gymnastic exercise for growth. Such children should, moreover, sleep on hard mattresses, remain little in bed, only just the time necessary to recover the strength. Seven hours of sleep and rest should be sufficient for them.

In general, gymnastics are here of great use, and all those exercises which consist in the continued raising of weights. Prolonged suspension of the body by means of the hands, wrestling, boxing, fencing, occasion a different vitality to the muscles, which increase and resist by their tonicity the extension of the bones which they cover.

APHORISMS.

345. Growth is one of the most curious manifestations of the motor force which rules, directs, and presides over the creation of the development of organized beings.

346. Growth takes place in obedience to regular and absolute laws, which vary according to climate, race, and sex, and which are only disturbed by the changes experienced in the organism from disease.

347. The diseases of youth always accelerate the process of growth.

348. The growth which results from the action of the diseases of youth is not so rapid as may be at first imagined; it is always more considerable *in appearance* than it is *in reality*.

349. The influence of diseases on growth should be directly referred to the influence of the febrile state which accompanies them.

350. Exaggerated growth acts in its turn as a cause of ulterior disease; and pulmonary, cardiac, or paralytic affection may be the consequence of it.

BOOK XXVI.

ON SYPHILIS.

Syphilis is a very common disease of a specific nature, engendered by a poison which attacks the vital and nutritive processes, subverts them, and exhibits itself, sometimes externally, by local affections, which present a specific and characteristic appearance.

Syphilis in the adult begins to be well known in some of its phases, thanks to the labours of Hunter and Ricord.* The laws of primary syphilis have been especially determined, but those of the constitutional affections are still a matter of speculation, and future observations will doubtless modify them greatly, if they do not upset them altogether.

Much less is known of the syphilis of newly-born infants than that of adults, and the difference of age produces so great a difference in the external forms of the disease that it renders the diagnosis very obscure. This form has been carefully investigated by Jacques Catanée, Nicholas Massa, Fallopius, Botal, Ferrier, Harris, De Blegny, Boerhaave, Astruc, Rosen, Doublet, Mahon, Bertin, &c. The work of R. J. Bertin† is the most valuable, from the number of his observations and from the acumen which marks them. Hunter, strange to say, scarcely notices syphilis in newly-born children, and the facts which he records are so disguised by theoretical hypotheses as to render them almost valueless. They are scattered throughout his book, and

* *Traité de la maladie vénérienne*, par J. Hunter, nouvelle edition, avec des editions par Ph. Ricord; Paris, 1852.

† *Traité de la maladie vénérienne, chez les nouveaux-nés, les femmes enceintes et les nourrices*; Paris, 1810.

ingeniously classed under the title of *Diseases which resemble Constitutional Syphilis.* They are, as he would make it appear, anomalies of such a nature as are not found in any nosological chart, and which await some ingenious man to find them a name.

Syphilis in newly-born children may be *primary*, *i.e.*, the result of accident, and acquired at the moment of birth or a short time afterwards, by means of a chancre contracted whilst passing through the external parts of the mother, or may be communicated by a stranger. It may be *hereditary*, and, consequently, *constitutional*, that is to say, transmitted by the father or mother during the generative process, or by the mother after conception, if at the commencement of her pregnancy she was infected with the disease.

1st. Of Primary Syphilis.

Primary syphilis in newly-born children presents the same characters as the disease in the adult. It commences by a chancre on the parts of generation, and more frequently in the mouth, on the face, or trunk. This chancre is cured, and there the matter may end; or, after the lapse of several weeks or months, *secondary* or *tertiary* symptoms supervene, as in the adult. These are well recognized facts in the present day, and on which it is unnecessary for me to dwell.

2nd. Hereditary Syphilis.

Hereditary syphilis is always constitutional, and, consequently, characterized by secondary symptoms; it may be the result of the father being himself the subject of inveterate constitutional syphilis. It is not less seldom the fault of the mother, who has at some former period been attacked with secondary symptoms, and who either has them at the time of her delivery or is about to have them at some later period.

It is produced—1st. By the impure impregnation of the ovum by the father. 2nd. By the development of a diseased ovum by the mother. 3rdly. By contamination from the maternal blood after conception, when the mother is infected for the first time, during the course of her pregnancy.

It is necessary for the transmission of the disease in the case of the mother, that she should still be the subject of the *secondary symptoms* of syphilis, for, according to the researches of M. A. Deville, it appears that tertiary symptoms do not affect the embryo. The ovum may be infected by the father when he is suffering either from secondary or tertiary symptoms.

It has been asserted, and Bertin has supported this opinion, that syphilis may be transmitted during lactation, and that a nurse, or a mother suckling her infant, and contracting syphilis may transmit it by means of her milk. There is nothing proved as respects this

point. Nevertheless, science is in possession of several facts which appear to favour the possibility of the poison being so transmitted. We may put to ourselves the question, why, if the milk of a woman who has been suddenly excited, produces instant convulsions in the child, the milk altered during its secretion by the syphilitic poison, cannot produce that disease, since afterwards, when saturated with mercury or iodide of potassium, this same milk loses its noxious qualities, and, made healthy, becomes the medium by which the cure is affected. But these are questions to which no satisfactory answer can be given, and over which the greatest obscurity still hangs.

Infection of the fœtus, in the womb of the mother, is a frequent cause of premature death, and of abortion at the fifth, sixth, and seventh months. Nothing is more common than abortion at the L'Hôpital de l'Ourcine, and in the houses where women suffering under the venereal disease are received. The greater number of women who abort many times in succession, and that without external injury, who cannot go the full time, and who are delivered of still-born children, are women constitutionally tainted, and who are, either themselves or their husbands, affected with latent syphilis. The proof of this assertion is, that it is often only necessary to submit the husband and wife, or one of them, if the guilty party be discovered, to treatment, for a subsequent pregnancy to have a happy termination. I have known many ladies who have thus had two or three successive abortions, and, suspecting the existence of syphilis in the family, I have discovered it to be present, at one time in the father at another in the mother.

It only remained for me to administer the proper treatment for the disease, when these ladies were delivered of healthy children at the full time. All surgeons have had similar cases under their care.

Thus, then, in hereditary syphilis, the first common danger is the death of the fœtus before the full time, and its premature expulsion; next follow the deeper lesions of the thymus gland, of the liver, of the lungs, and also the rare occurrence of local venereal affections on the body before birth—sometimes also children are born with syphilitic cutaneous eruptions—but most commonly, if they reach the full time, they are born without any external traces of syphilitic disease. These affections show themselves at a later stage.

The time at which syphilitic symptoms show themselves in a child who has inherited the germ of the disease, is almost constantly about the first or second month of extra-uterine life; thus nothing is more common than to see mothers, whose constitutions are infected with syphilis, give birth to children who are at first to all appearance healthy, but at the end of a month or six weeks these children are attacked with syphilitic symptoms such as I am about to describe. Some observers have noticed syphilitic affections show themselves

in newly-born children on the eighth day after birth, but this circumstance is very rare, and deserves to be carefully investigated, for fear of a mistake which might very easily be committed. It must be remembered, in order to form a just diagnosis of these cases of hereditary syphilis, that many surgeons mistake eruptions common to young children, for syphilitic affections, to which they do not present the slightest resemblance.

Can syphilis show itself by external symptoms at the very moment of birth? This is still a disputed question. Practitioners of the greatest eminence, and amongst them ranks M. Ricord, believe that cases of this kind have been recorded in a very loose manner. M. Ricord founding his opinion, amongst other reasons, on this, that in the small number of cases which have been noted, the children were still born, was inclined to believe that these so-called syphilitic eruptions were only simply commencing decomposition of the cuticle. This perhaps is not a very satisfactory explanation, for M. Deville has had the opportunity of observing on a newly-born infant numerous and well marked mucous tubercles on different parts of the body. I have seen one case at the hospital of La Pitié, under the care of M. Michon, in a child who lived three days, and who was born before the full time, at seven months.

In addition to mucous tubercles and red brownish copper-coloured pustules on the legs and arms, the vulva was swollen, the nymphæ ulcerated and covered with an abundant leucorrhœal discharge, and onychia was present on all the fingers and toes.

At the autopsy I discovered no disease in the periosteum or in the structure of the long bones, the lungs and thymus gland were healthy, no change was to be seen in the liver, all the abnormal appearances were on the surface of the body.

The mother had contracted syphilis during the first month of her pregnancy, and had had a discharge, *doubtless an undetected chancre*, afterwards pustules on the labia. At the time of her delivery she was quite well.

It may be asserted then as a general rule, that hereditary syphilitic affections do not appear by outward signs, until about the fifth or sixth week after birth, but that they may in some rare cases produce syphilitic eruptions before the child has seen the light. In the greater number of cases of this kind which have hitherto been recorded, the child at the time of birth had been dead several days, but it may also be born alive. M. Paul Dubois has noticed several cases of syphilitic pemphigus in children who have survived.

M. Gubler has likewise seen a similar case at the Hospital of St. Louis, and I witnessed the most curious case of all at La Pitié, in the child whose case I have just related.

The symptoms of congenital syphilis are as numerous in their forms as they are uncertain in their seat. The local evidences of the syphilitic poison are internal or external, and may appear on the skin and mucous membranes, under the form of syphilitic eruptions, and in the internal organs, such as the thymus gland, the liver, the lungs, the bones, &c., under the appearance of plastic infiltrations, or unhealthy suppuration.

On the skin, they show themselves in the form of desquamations of the epidermis, of the face, and extremities, fissures in the hands at the situation of the folds of skin, vesicles which multiply, become confluent, and form superficial ulcerations of greater or less extent, which have a jagged appearance, and present a red, livid, coppery surface, covered with small greyish dry crusts. At other times they are in the form of ecthymatous pustules, or syphilitic tubercles, pustulous or mucous patches which appear on all parts of the body, but more particularly in the neighbourhood of joints, or in the region of the anus or perinæum. These patches do not differ in the child from the appearance they exhibit in the adult, if we except their habitual small size, their marked flabbiness, and the abundance of purulent matter which they secrete. In other children they appear as syphilitic bullæ, and as more or less numerous phlyctenæ of pemphigus. In others again, it is a specific inflammation of the edge of the nail, which constitutes onychia, and I have counted twenty on the same child, *i.e.*, as many as the fingers and toes. On the mucous membranes it shows itself in the form of pustules around the anus and mouth, of numberless fissures on the chapped lips, of aphthæ on the internal surface of the cheeks, and very rarely ulceration of the throat and soft palate, and also of numerous ulcerations of the nose, followed by an abundant secretion from the nostrils.

Internally, in many glands, in some of the viscera and in the different organs, the lesions are not less various.

We already know that curious condition of the thymus gland which M. P. Dubois has met with in many children, the issue of syphilitic parents, and themselves presenting symptoms of constitutional syphilis. The thymus presented nodules of inflammation and suppuration scattered throughout its substance. These cavities, full of pus, examined with the microscope, have not hitherto presented to M. Dubois any other pathogenic appearances than what I have just described; thus making the same reservations as I do, this talented professor was right to believe the change to be of a specific nature.

In the lungs, lobular nodules, with a yellowish plastic and greyish effusion, and with suppuration, have been noticed by Billard, Ollivier, Husson, Cruveilhier, as nodules of lobular pneumonia occurring before birth, and often coincident with syphilitic pustules. At least that is what Ollivier has stated in Billiard's work, and Cruveilhier in his Pathological Anatomy.* But M. Depaul has gone farther; he has

* *Anat. patholog. du corps humain*, avec pl.; t. i, 15e livraison.

shown that these plastic nodules were not lobular pneumonia, but truly a specific lesion, which is only found with other syphilitic phenomena in the child or its parent, and that it must be looked upon in the light of a specific change, belonging to constitutional syphilis. M. Depaul, in forming this conclusion, relies, moreover, upon the important fact, that these changes are only observed in infected children, or in those born of parents who have had syphilis. This coincidence is with him a criterion of certainty. A distinguished accoucheur, M. Cazeaux, in a very elaborate treatise, has objected to this conclusion, which, according to his opinion, is too strict, and he has thought that these changes might as probably partake of the nature of inflammation not of a specific kind, as be the result of syphilis. But M. Cazeaux appears to me to have far too much sacrificed the probabilities in favour of this exigency of the bare anatomical facts. He demands that a lesion should exhibit the nature of its first cause, whilst he himself knows very well that lesions, the result of constitutional syphilis, are not absolutely and always recognizable at first sight. If we reasoned in this way, we should return to the dark age of Broussais, when every disease, even syphilis, was classed under the title of inflammation. We must not, then, tax anatomical facts too far, for fear of injuring them in the estimation of surgeons, and when they have no absolute signification, it is to the antecedent and concomitant circumstances to which we must look to determine their true nature. This M. Depaul has done; he has often noticed suppurating pulmonary nodules accompanying hereditary syphilis; he concluded that one might be the cause of the other, and he was right.

In the liver, a special and specific alteration takes place, which was first noticed and written upon by M. Gubler.

It consists of a fibro-plastic induration of the liver. It may be *general* or only *partial*. In the first case, which is very rare, the hepatic gland is, throughout, hypertrophied, indurated, elastic; its colour is pale yellow; its tissue semi-transparent; the distinction between the two substances has disappeared, and its surface only presents some small whitish opaque granulations, which may be compared to grains of semolina.

Generally, the change is *partial*, and in some respect circumscribed. It appears in the form of a yellowish, clear, semi-transparent nodule, varying in size, and well distinguished by its colour from the other brown parts of the liver. This nodule of induration presents at other times the general physical characters of fibro-plastic induration. The finest injections do not penetrate the indurated tissue, and microscopical analysis enables us to prove the presence of a large quantity of fibro-plastic elements, nuclei, and cells, more or less elongated and slender. It is essential, however, that these elements should be present in great

numbers, and should have been taken from a portion of the liver altered in character, yellow and hard, in order that their presence may have any real weight. Unless such be the case, as the liver of newly-born children in the normal state contains always a certain quantity of fibro-plastic tissue, we may be deceived, and assert on seeing a small number of these elements that the liver is diseased, when it is perfectly healthy—a little experience will enable us to avoid this error.

[Dr. Böhmer, having met with an instance of this kind which was declared by Dittrich himself to be an instance of the congenital syphilitic affection of the liver, in order to investigate this subject, examined the bodies of all the syphilitic children who died at the Viennese Foundling Hospital; he, however, was unable to find this hepatic affection in any other instance. In the case referred to, there was exudation on the surface of the liver, uniting it to the diaphragm, and forming a pseudo-membrane of areolar tissue, which passed also into the liver, but did not especially inplicate the portal canals.—P.H.B.]

In the periosteum, and in the bones, we sometimes, but very rarely, meet with these changes which we so frequently see in the adult when suffering from constitutional syphilis. Amongst infants attacked with hereditary syphilis, Bertin only met with a single instance of periostitis; M. Laborie has recorded another, accompanied with well marked caries. The lesion which I have frequently observed, partakes neither of the nature of caries nor of degeneration of the periosteum, it is characterized by premature induration of the long bones. In children born before the full term, or born dead, instead of soft, spongy, vascular bones, not yet perfectly formed, and easily cut with a scalpel, I have seen the middle of the tibiæ and femora, solid, compact, eburnated, and impossible to break or divide them with a cutting instrument. This is a change to which I do not attach much importance, but which is, nevertheless, of sufficient interest to be mentioned here. It seems to denote an abnormal and precocious activity in the development of the bony tissue, which corresponds with the plastic secretions observed in many other organs.

Lastly, with all these local specific manifestations within and without, and I may say in addition to these symptoms, sometimes a certain number of the general signs of reaction are visible, and which give us the amount of syphilitic poison, and the power of resistance of the newly-born infant. The children are pale and weak, their skin is often rough, especially the face; their debility increases, the appetite is small or completely gone; they rapidly emaciate, diarrhœa supervenes, which further exhausts them, and if they are not rapidly cured they sink into a state of venereal marasmus and cachexia, from the effects of which they fail not to perish.

The diagnosis of hereditary syphilis may present great difficulties.

Much depends upon the investigator, and on his tact, some surgeons, unfortunately influenced by reminiscences of the doctrines of Broussais, are still in the present day inclined to consider as of a simple inflammatory nature the bullæ which appear on the skin, the fissures of the mucous membranes, the affections of the liver, the abscesses in the thymus gland, and the plastic and purulent infiltrations of the lungs, which I consider as syphilitic. They demand that the specific nature of these affections should be proved, by pointing out the anatomical characters in which they differ one from the other, thus affording a melancholy example of absolute reliance on the crude results of pathological anatomy, as if ever as many anatomical variations had been discovered, as there are general and individual specialities. From this grave error, into which an entire school plunged, coincidences are not taken into account, the antecedents of the patients, their age, the districts they inhabit, all are of secondary consequence to the lesion itself, whilst, on the contrary, we ought to view these different circumstances as revealing the decided character and true nature of the anatomical changes. It may be easily understood the amount of difficulty such a manner of viewing facts has caused in the diagnosis of hereditary syphilis, and why certain surgeons have candidly declared this diagnosis impossible.

We shall proceed differently. Persuaded as we are that it is impossible to ascend from lesions to their causes, whilst it is easier for experience to assign causes to the lesions, we shall bear in mind the circumstances abnormal to the child, which may enlighten us as to the nature of its disease. The fact of syphilis having occurred either in the father or mother, invariably pointing out a latent constitutional taint in the newly-born child, must not be kept in the back ground or in the shade. The child who inherits the external traits of its progenitors, and the morbid disposition of all their organs, cannot come forth pure from a germ developed or impregnated under the influence of syphilis. And when a like fact is established, it is impossible to consider it otherwise than a ruling principle controlling all secondary facts, as absolutely as the powerful and vivifying properties of the sun regulate the development of the plant whose seed has been exposed to it. Syphilis being then admitted as interwoven with the impulse communicated to the germ, at least a coincidence, if not a modified impulse results, the effects of which we shall ultimately witness.

For myself, I believe in a modified impulse, but I rely solely on the fact of the coincidence, which at present is sufficient for my illustration. I presume then that the parents have the syphilitic taint, and the child affected with a lesion of a doubtful nature, inflammatory or specific, according as each may be of opinion. The first case in

which such an appearance presents itself disbelief is allowable, for experience must necessarily be obtained, but in a second and third case the same thing is observed; ten, twenty, or thirty instances or even more follow on each other, and in every case the newly-born child is always the subject of a doubtful disease, and in each case its parents are tainted with syphilis, then the doubt must vanish and give place to certainty.

But hitherto I have only spoken of doubtful lesions. What then is to be concluded, when notwithstanding what can be said on the subject, these abnormal affections, different in their appearance, present distinctive characters, and group themselves in pairs or even in threes or fours in the same individual, with an appearance of uniformity? Is there not in this constant assemblage of suspected lesions an overpowering revelation of their intimate nature differing from a simple inflammatory cause? Is there not evidently beyond these lesions a general specific cause which begets them? But then, if such a cause exist, and if we must leave the domain of ordinary inflammation, what other specific cause can we allow if it be not that of syphilis, which is observed in the parents. There is no longer any doubt in this respect; the study of antecedents is of the greatest importance in those affections of newly-born children, which are believed to be the result of syphilis.

This is not yet all; in these lesions, obscure as they may be to many surgeons, I discover distinctive characters which separate them from ordinary inflammation; most assuredly syphilitic pemphigus does not resemble simple inflammatory pemphigus; the pulmonary nodules described by M. Depaul no more resemble lobular pneumonia than the plastic infiltration of the liver, or the diffuse suppuration of the thymus gland, approach hepatitis or simple inflammation of the thymus gland.

Infants affected with hereditary syphilis may be rapidly cured when they are treated in a proper manner—one even sees cases which have reached the last stage of marasmus, and which terminate in recovery. But in such a case death is much more commonly the consequence of the disease.

The treatment consists in subjecting the mother to a mercurial course, whether she herself manifests evident symptoms of syphilis, or whether she does not.

Might this mercurial treatment be proposed to a healthy nurse who has the care of an infant affected with syphilis? This is a more serious question than would be imagined at first sight, for it is generally asserted, but without too great proof, that the use of mercury may produce very serious inconvenience. I hardly believe it, and for my part, I have never seen mercurial treatment, properly carried out, followed by an unfortunate result. In making such a proposition to

a nurse, we must carefully explain to her the consequences that may result from it, that she may herself decide with a full knowledge of all the facts.

As regards the mother we need not hesitate. In the present state of our knowledge, the fact of transmission of syphilis by the father is not very certainly established, and in almost all the cases of well observed hereditary syphilis, the cause has been found to depend on the mother. But whether the mother has or has not apparent symptoms of syphilis, she is not the less under the influence of a syphilitic diathesis, which should be treated by mercury. If she nurse, the mercurial treatment possesses a double advantage, since it acts at the same time both on the mother and child.

The treatment attended with the best results consists in administering to the nurse pills of proto-iodide of mercury in doses of .75 to 1.5 grains daily, without pushing it to salivation:

Proto-iodide of mercury	15 grains.
Pulv. glycyrrhizæ	15 grains.
Mucilage	q. s.

To be made into thirty pills (silvered), two or three to be taken daily.

Under the influence of this remedy, although minute analyses have not detected any trace of the medicine in the milk, the children are rapidly restored to health, and the syphilitic affections disappear.

If analysis do not detect the mercury in the milk it is no reason why it should not be present, more particularly if we reflect on the very small quantity which must be mixed with it. For instance, nurses who took from .30 to .60 grains of iodide of potassium daily, had sensible traces, but only slight ones it is true, of iodine in the milk. Since an agent so easily detected as iodine is only found in small quantities, how difficult, then, must it be to recognize mercury, which requires very complicated manipulations to detect it, and of which the patients, proportionally to the iodine, can take but very small doses.

[M. Cazeaux (*Bulletin de l'Acad.*, xvi) terminated a prolonged discussion at the Academie with the following conclusions: 1. In the immense majority of cases the symptoms of constitutional syphilis are not manifested until some weeks after birth. 2. Such excessive rarity should give rise to great caution in the nosological classification of the lesions of new-born children. 3. The coincidence of old syphilis in the parents, and of doubtful or ill-characterized symptoms in the infant, is insufficient to establish the relation of cause and effect between the two facts. 4. If pemphigus and abscess of the lungs and thymus may rigorously be referred to a syphilitic origin, there is no proof that they may not be due to other causes. 5. Pemphigus has long been observed, and referred by authors sometimes to syphilitic cachexy and sometimes to other causes. 6. In the actual condition of science it is impossible to distinguish alterations which may be syphilitic from those which result from other morbid conditions of the parents or fœtus; and this uncertainty should render a practitioner very circumspect in pronouncing an opinion upon the nature of such

lesions. 7. It is not allowable to put parents under treatment when the child exhibits only doubtful signs of constitutional syphilis, but even were such signs certain in the child, we must seek for their exact explanation in the history of the parents. 8. The question is still open to study, and requires numerous researches for its explanation.

Dr. Behrend (*Journ. für Kinderkrankheiten*, xvii), referring to the above discussion, lays down the following positions as to the results of his own experience: 1. Syphilis may be imparted to the fœtus either by the father or mother, or by both together. It is most frequently communicated by the father. 2. The general effect of this syphilitic poisoning of the fœtus is the production of a diminution of its vital energy—a diminution varying in intensity according to the degree of virulence of the disease in the parents, and the congenital vital capabilities of the fœtus. 3. Under the influence of a very considerable diminution of this vital energy, the fœtus dies between the third and sixth month, and is expelled. Most of the cases of so-called habitual abortion depend upon the syphilitic condition of one or both parents. 4. If the fœtus remain in utero until the eighth month it may die either during the act of labour or soon after, mostly exhibiting very remarkable appearances, that can only be ascribed to syphilis. 5. There are chiefly excoriation on various parts of the body, especially the feet and hands, as if these had been scalded; rhagades at the angles of the mouth and alæ nasi, superficial ulceration of the nares, condylomata within the mouth, pemphigus, rupia, ecthyma, cutaneous ulcerations, tophi, and caries. 6. To the doubtful, but very probable, signs of syphilis, appertain suppurations of internal organs, but especially of the lungs and thymus; for the due estimation of which, however, additional observations are required. 7. Roseola syphilitica, appearing in a fortnight or later, in a healthy child, may be a consequence of congenital syphilis; but it may also have arisen from a fresh infection acquired during or immediately after birth. 8. The birth of a child suffering from congenital syphilis fully justifies the antisyphilitic treatment of the parents, and especially the mother, as soon as she becomes pregnant again, even if she has not just before, or at an earlier period, herself manifested symptoms. It is through the mother we must influence the fœtus, and endeavour to save its life. 9. If the mother or father manifest signs of the syphilitic dyscrasis, we must at all times employ antisyphilitic treatment, in order to enable them to propagate sound children. 10. A child born with symptoms of syphilis must be treated as early as possible for these, in order to give it the only chance of living.

As it has frequently been stated that women are incapable of producing children while actually labouring under syphilis, Dr. Beither relates a very remarkable case in which a woman during fourteen years exhibited a very marked secondary and tertiary syphilis, and bore during that period four living children, her symptoms undergoing exacerbation at each pregnancy. The children exhibited no external signs of syphilis, and died of other diseases several years after. The woman never aborted, and her husband remained unaffected. Dr. Spiro, of Moscow, also states that amongst sixty-four pregnant women, suffering from syphilis, who came under his own care, six became pregnant while undoubtedly suffering from secondary syphilis. In twelve this was doubtful, and in forty-six the syphilis was acquired during pregnancy.—P.H.B.]

3rd. Of Syphilitic Coryza.

Certain children born of syphilitic parents, having already on their bodies local evidence of syphilis, sometimes present inflammation of

the pituitary mucous membrane. This is what is termed syphilitic coryza.

Independent of the first and general cause of the coryza, this disease is serious on account of the mechanical obstacle which it offers to nasal respiration, and consequently to the movements of suction of the infant. Thus we have stated in the chapter devoted to acute and chronic inflammatory coryza, this obstruction alone may of itself occasion the death of newly-born children. It is, therefore, important to be well acquainted with every symptom pertaining to it.

The nose is red and swollen at the orifice of the nostrils, cleft by numerous fissures; discharges of a sanious, purulent, or bloody nature, or pure blood, are continually poured forth. Crusts are formed which entirely obstruct the nasal fossæ. The mucous membrane, of a livid red colour, swollen, softened, is often the seat of superficial ulcerations, which pour forth blood at the slightest touch. Respiration is sniffing, impeded through the nose, taking the breast is difficult, sometimes impossible, and the child may die of hunger if this state is prolonged. This form of coryza requires local and general treatment. In the shape of local measures, at first emollient lotions, subsequently astringent ones, and cauterizations with nitrate of silver if the inflammation is well marked, are the best therapeutic agents. The dose has been mentioned before, when treating of inflammatory coryza. As to the constitutional treatment, the children must take from three to seven and a half grains of iodide of potassium daily, and under its influence the local affection is rapidly ameliorated.

The following is a case in which simple topical means were sufficient to disperse the affection:

I had occasion to observe, under the care of M. Trousseau, three cases of chronic coryza, appearing in children at the breast who were affected with an hereditary syphilitic taint, showing itself by eczema of the whole body and of the face. One of the children, aged four months, lay in No. 3 bed in St. Theresa ward.

It was emaciated, puny, pallid, and exhibited on its body numerous dingy, coppery-coloured patches, the result of the cicatrices of old ulcers. On the face were several syphilitic papulæ, and on the lip a pustulous yellowish patch, with abrasion of the skin. On the dorsal surface of one of the fingers a deep ulcer was seen, with red edges and a greyish surface, resting on an indurated base.

The orifice of the nostrils was obstructed by blackish crusts of dry blood, constantly destroyed and as often renewed.

Respiration was difficult, sniffing, the child could not suck without experiencing the inconveniences and the dangers which I have before mentioned. These phenomena vanished at the expiration of two months, and the child went out almost cured from the effects of treatment by the remedies of which we have just spoken.

Cases of this nature are not very uncommon, and M. A. Deville has been so courteous as to furnish me with several which have been received

into L'Ourcine Hospital. One of them is very interesting, and I shall give the case in detail. M. A. Deville has sent me four cases of newly-born children affected with coryza, and all four were born of mothers who were tainted with syphilis. Three of them presented at the same time on their bodies symptoms of syphilitic infection.

These children were treated by iodide of potassium in the dose of from four and a half to seven and a half grains daily, and their condition rapidly improved under its influence. Three were perfectly cured, the fourth fell a victim to the effects of an intercurrent disease, viz., small pox. This treatment is, in fact, that which we must put in practice when we suspect the existence of a syphilitic taint as the cause of coryza. Here is the fourth case, of which I have just made mention.

Case. Coryza in a newly-born child: ulceration of the perinæum—such as frequently occurs in children born of mothers affected with syphilis.

The child, Celestine Victoria, was born at L'Ourcine, February 10, 1842; her mother had, four years ago, sores on the vulva, for which she was admitted into the Hôpital des Cliniques, where she only remained fifteen days, and the cure was affected by means of ointments.

For the last four or five years, her mother has been quite well, she passed favourably through her first pregnancy; her first child was healthy, but died of brain fever at the age of seventeen months; she became pregnant a second time, having connection only with the same man, whom she had known for five or six years, and whom she never knew to be diseased. During her pregnancy she experienced pains in the genital organs; which were followed by the appearance of ulceration in the vicinity of the anus, on account of which she returned to L'Ourcine in the course of the month of October; she left the hospital in December to prepare for her confinement, but not cured, for the pain was constantly occurring. Since her confinement, fresh ulcerations have appeared around the margin of the anus.

As regards the child, who was quite well during the first weeks, she was attacked about the 25th or 26th of March, with coryza, which was marked by extreme pain on breathing through the nose, a discharge from the nose which was at first purulent, subsequently bloody, occasionally indeed a slight discharge of pure blood. The mother troubled herself but little about the coryza until she noticed the discharge of blood, and then, in the early part of April, she noticed the appearance of numerous red spots in the folds of the nates, next a superficial ulceration of the middle portion of the palatine arch near the soft palate. At this time the mother showed me simply the ulceration on the palatine arch, which I cauterized with a pencil of nitrate of silver.

April 8th. The following is the present condition of the child: respiration through the nose, which is well formed, is almost impossible, the little patient is therefore obliged to breath entirely by the mouth. There is a profuse nasal discharge, which appears to consist principally of pus, but which is at times, according to the mother's statement, accompanied by a discharge of blood. On the middle surface of the palatine arch, near the soft palate, is a ragged ulcer, not deep, with a light grey surface, from .12 to .16 of an inch long, and about .04 of an inch broad. Around the anus, on the internal surface of the nates, and a little way down the thighs, are several patches of a vivid red colour, not raised, some of which are superficially ulcerated and red at these points. Cleanliness was insisted upon, and cerate dressings to the red patches on the nates. The ulcer on the

palate was occasionally touched with the pencil of nitrate of silver. With respect to the nasal affection, the good effect produced at this time in another little patient in the same ward, encouraged M. Nélaton to prescribe seven grains of iodide of potassium to be taken daily. This child was nearly the same age, and had the same affection of the nose as in the present case, and like this one was born of a mother with the syphilitic taint.

April 11th. As yet no great change, except that on the outer two thirds of the tongue are numerous whitish patches, very like thrush; the mother, however, declares that this portion of the tongue has always been white, less indeed than it is at the present time. Being in doubt, and as another child had just died the same day of thrush in No. 5 bed of the same ward, M. Nélaton ordered the white part of the tongue to be touched with a brush previously dipped in a mixture of mel. rosæ and hydrochloric acid.

April 17th. The child still continues to have a very abundant purulent discharge from the nostrils; the ulcer on the root of the palate is cicatrized, but the left eyelids have been since yesterday red externally, and greatly swollen, as in purulent ophthalmia; notwithstanding this, the conjunctiva is but slightly reddened, and there is very little purulent secretion. The right eyelids are slightly red externally; to be touched night and morning with a brush dipped in a solution of nitrate of silver.

April 25th. The palatine arch is now quite healthy, the ulcerations around the anus are also cured, the nose is progressing favourably, air can already pass by the nostrils, and the discharge has wellnigh ceased.

May 1st. The improvement still continues.

May 5th. There exists no longer any disease.

May 19th. The child has ceased to take the iodide of potassium. For several days the cure has been complete; the child is to be vaccinated by two punctures in each arm.

May 25th. The vaccine matter has not taken; but this is a common case in the ward.

June 5th. The child is discharged with her mother, both of them being quite well.

4th. Of Syphilitic Pemphigus.

Syphilitic pemphigus is an eruption of bullæ on the skin, characterized by the appearance of rose-coloured spots, followed by the formation of bullæ, filled with pus, and covered with brownish-yellow, thin, and lamellated crusts.

It is most commonly congenital, occuring before birth, of which Gilibert, MM. Paul Dubois, Morin, Depaul, myself, and many others have seen instances. Nevertheless, it does not sometimes come on till one or several days after birth.

I take a case indiscriminately, and the following is one of congenital syphilitic pemphigus, reported by M. Morin.

Case. A woman, whose husband had formerly suffered from a severe attack of syphilis, had six successive abortions, in which six still-born children were expelled, and at last she gave birth to a seventh child, which was alive, this one was covered with pemphigus, had ulcers on the vulva and rectum, with copper-coloured patches on the face, and chronic coryza.

This was enough to mark the case as one of constitutional syphilis; M. Morin

had no fear in stating it to be so, and in recommending a specific course of treatment both for the child and for its parent. He will be wrong in the eyes of the opponents of the syphilitic doctrine, but he cured his patients, and gave the woman the chance of conceiving strong, healthy, and vigorous children. This is of more value, in my opinion, than the expectant treatment advocated by certain dogmatists of the modern school.—(*Gazette des Hôpitaux*, 1851.)

Syphilitic pemphigus always occurs in the acute form, and the characteristic bullæ are generally of the size of a pea, or of a small nut. They are more or less numerous, and this is regulated by certain rules which are not yet determined. Naumann has counted more than one hundred on the same child, they are in that case very close to each other, and some are confluent at their base. They contain a yellowish, purulent fluid, which is sometimes fœtid, occasionally even pure blood according to the observations of Garus and Ring. They show themselves on all parts of the body. The best marked are found on the sole of the foot and on the palms of the hands. The violet or bluish colour of the skin at their base strongly contrasts with the pinkish hue of the other parts. Sometimes the skin is abraded, ulcerated, and covered with a plastic membranous deposit, as was noticed in M. Gaide's case. These superficial ulcerations sometimes include the whole thickness of the skin and suppurate abundantly. Their edges are mostly elevated and rounded, and at different points is seen, as was remarked by M. P. Dubois, the appearances of the latter stages of ecthyma.

Syphilitic pemphigus may occur in well developed children whose nutrition has been normal up to birth, or in weak puny children prematurely born. It produces a remarkable and rapid change in the health, and death commonly quickly follows its appearance.

Doubts have been raised as to the reality of the existence of such a disease as syphilitic pemphigus in newly-born children, and on the possibility of recognizing it. An animated discussion on this point occurred very recently in the council of the Academy of Medicine, between MM. P. Dubois, Ricord, and Cazeaux.* M. Dubois, who advocated the syphilitic nature of pemphigus in newly-born children, appeared to me to have the advantage over his antagonists. In a very striking speech he established the characters of the disease very nearly identical with those I have just given, and showed on one side that syphilitic pemphigus occurs in the adult, according to the admissions of M. Ricord, and on the other that amongst children otherwise healthy, who are affected with pemphigus, and who are far removed from the debilitating influences of poverty, you may bring home to the parents the traces of an old syphilitic affection, or obtain from them, as regards this point, undoubted information that such is the case.

* *Bulletin de l'Academie de Médecine.* Paris, 1851; t. xvi.

He also proved that many children have in addition other marks of syphilis, on the soft palate, in the pharynx, thymus, lungs, and bones. He then brought to their remembrance that another physician, M. Danyau, had cited analogous cases, especially one in which a child was the subject of congenital pemphigus, on whom a rose-coloured rash appeared at a later period, which Cullerier considered to be syphilitic. In conclusion he wound up his dissertation on the undoubted occurrence of syphilitic pemphigus in newly-born children with the following anecdote:

M. Dubois was attending a young married woman, whose husband having contracted primary syphilis, was so imprudent as to cohabit with her, and also was guilty of equal imprudence in being very careless in respect to the treatment of his case.

Some months afterwards secondary symptoms appeared in both of them; the young wife became pregnant, and was delivered at the end of four and a half months of a fœtus which appeared to have been dead some days. It was then, and through this miscarriage, that M. Dubois learnt the above history. He placed the wife and husband under an antisyphilitic plan of treatment, which was not followed with so great an improvement as was desirable. Three months after this a second pregnancy occurred, which this time reached very nearly the full term. The accouchement occurred unexpectedly and terminated in the birth of a dead child which was covered with pemphigus. This young woman having become a third time pregnant, from the advice of one of her friends, thought she might be more fortunate if she changed her medical attendant. M. Moreau was called in, and his new patient had reason to think that fortune would be more favourable to her, for she went this time the full period and brought forth a living child, and to all appearance healthy; notwithstanding, in a fortnight or three weeks afterwards, a syphilitic eruption appeared. The child was placed under a specific plan of treatment and was cured.

Well marked congenital pemphigus may then be considered as a manifestation of syphilis.

It can now no longer be doubted, and the real question which occasions a difficulty in this dispute, and which I would by no means appear to soften down, is to know whether this form of pemphigus can be recognized. Yes, this is the whole question. For my part, I believe that this diagnosis is possible, and presents as many points of certainty as any medical assertion. I will prove it.

First, then, if pemphigus is congenital, there can be no doubt on the point, for always, up to this time, congenital pemphigus has been met with in the offspring of syphilitic mothers.

But the pemphigus may not be congenital. It may come on some days after birth; this may be simple pemphigus; it may be pemphigus caused by the deleterious influences of poverty on the milk of the mother and on the constitution of the child. But here again, in the greater number of cases, we find syphilis in the father or mother, or such retrospective information as is sufficient to establish the existence

of an anterior syphilitic infection. There is in this, doubtless, only a coincidence, and every coincident cause is assuredly not the exciting agent of a concomitant lesion. But if the relation is not decided on, it presents at least some marks of probability. The truth hangs upon a single thread, that is to say, on the presence of a collection of concomitant phenomena. Let us see, then, what are the phenomena which we should consider sufficient to establish the syphilitic nature of pemphigus. This probability, once established, we shall notice that in one case the bullæ are filled with well marked yellowish pus, whilst in the simple pemphigus they contain a liquid serosity, clear or opaline. In the former, the colour of the abraded skin is red and livid, elsewhere of a clear pinkish blush. In the former, the skin is eroded, even ulcerated; in simple pemphigus, ulceration is never present. Bullæ in the former are coexistent with syphilitic lesions in other organs, with syphilitic cutaneous affections, or syphilis attacking the mucous membranes, with scattered abscesses in the substance of the thymus gland, or the lungs, with fibro-plastic degeneration of the liver, with onychia, &c., whereas, in simple pemphigus, the bullæ constitute the sole disease. Lastly, one is cured with difficulty, and when it is cured, it is by means of mercury given to the child and to the nurse, whilst the other is cured by merely simple remedies.

Syphilitic pemphigus is a serious disease, which, depending upon a congenital vital lesion, triumphs over all the organic nutritive efforts, and holds out but few hopes of recovery. It often causes death of the children, and that in a few days. There are some newly-born children strong enough to offer a longer resistance, but who in the end fall victims. Some are cured when the syphilitic pemphigus is uncomplicated by any severe visceral affection, but when at the same time those changes which I have mentioned are present in the thymus gland, liver, and lungs, then death is certain.

The treatment of this form of pemphigus is a specific treatment. The bullæ are not to be considered, we must go farther back and rapidly effect an alteration in the constitution and blood of the children. In this we shall succeed by means of mercury, either given through the medium of the milk of the mother or nurse, or administered directly to the children.

When the mother nurses she must take every day two pills, containing each half a grain of the proto-iodide of mercury.

If it be a wet nurse who is suckling the child, she must be warned at the commencement of the possible risk she runs of being infected; she must be asked to undergo the treatment necessary to restore health to the child, and if she agree, she need only take a pill every day, containing half a grain of proto-iodide of mercury. When the nurse is afraid to take the remedies, and the mother does not suckle her

child, the infant must be treated directly. It must take every day, by teaspoonfuls, the following mixture:

Distilled water	℥ iss.
Mucilage	℥ ss.
Van Swieten's solution	gtt. xl. to ℥ j.

In every case, sublimate lotions must likewise be applied to the body of the children, and they must be placed every day in a sublimate bath:

Hydrarg bichlorid	15 grains.
Eau de Cologne	℥ ss.
Distilled water	℥ iv.

To be mixed with the water for the bath.

If the pemphigus be not complicated with more serious affections, it will be cured under the influence of these remedies; but if, at the same time with the pemphigus, coryza, angina, or thymic, and pulmonary affections are present, iodide of potassium must be administered, from three to seven and a half grains must be taken daily in water or in sweetened milk.

The following cases of syphilitic pemphigus, borrowed from several authors, are possessed of great interest:

Case 1. *Pemphigus showing itself successively in four newly-born children; death of the first three.* By M. Debreuil.

Marie Garbail, aged thirty-four, a native of Bourdeaux, married at the age of twenty, her first child is still alive, her second died when two and a half years old, from the effects of croup.

Seven years ago, Marie Garbail was wet nurse in a Polish family. The nursling was born covered with bullæ similar to those with which the youngest child of this woman is at present affected. After fifteen days, she noticed just above the right nipple a small pustule, from which fluid issued, and which ulcerated. This ulcer, which was about the size of a quarter franc piece, cicatrized at the end of six weeks. Being alarmed at this circumstance she consulted a surgeon, whose name or residence she does not recollect, who advised her to restore the nursling to its family; she took, very irregularly, some pills, the composition of which she does not remember, some cooling medicines, and also used some baths. The child was confided to another nurse who then lived in the Rue Laroche, but whom I have not been able to find. It appears, however, that about a month afterwards it died covered with sores, and in a state of emaciation dreadful to behold; the nurse was attacked with extensive ulcerations in both breasts, for which she underwent a prolonged course of treatment.

This was all I could learn. As regards our woman, the sore cicatrized, and she gave herself no further anxiety; three months afterwards she became pregnant. She was delivered at the end of nine months of a child, which had bullæ of pemphigus on the inferior extremities and on the organs of generation: she nursed it; it became much emaciated, and died at the end of a month.

Again pregnant, she brought forth another child who presented the same

appearance, and met with the same fatal termination as the last. A third time pregnant, eight days after the birth of the child, a similar disease to that of the other children showed itself, and although she would not nurse it, it died at the end of three weeks in a state of exhaustion. Lastly, five months since she was again confined, and brought forth a child, to all appearance perfectly healthy. Eight days after its birth, bullæ of pemphigus appeared on the soles of the feet, on the legs, thighs, hands, and fore arms; they disappeared from the feet and legs, but they invaded the parts of generation, the scrotum, penis, and circumference of the anus. The trunk was quite free. The midwife who was in attendance at the labour made the child take a certain syrup, by teaspoonfuls, but seeing that the disease was becoming thicker on the parts of generation, G——— consulted me. A most careful examination of this child, and interrogation of the mother, was conducted in my father's presence.

After having related to me what I have just detailed, I examined the child; it appeared in rather a favourable condition; its constitution is rather strong than weak; it cries frequently, and appears at times to suffer acute pain. When nursed by its mother it takes the breast readily, the digestive functions are well performed; on the feet, legs, and portions of the thighs are found copper-coloured cicatrices; higher upon the scrotum, penis, pubes, perinæum, and around the anus, are clustered bullæ and pustules, the one filled with a serous fluid, the other with a sero-purulent liquid; they are surrounded by a violet-coloured areola. The buccal mucous membrane is healthy. It is precisely, according to the mother, an eruption of the same nature as that which appeared on the other children. It is very unfortunate that *post mortem* examinations could not be made on these last.

The woman has been subject for many years to a scanty leucorrhœa. She assured me that she never infected her husband. Whilst being very careful as to giving an opinion as to the nature of these affections, having moreover no occasion to dissemble with her family, I placed this woman under an anti-syphilitic plan of treatment.

Case 2. *Syphilitic pemphigus, and numerous abscesses of the lung, in a newly-born infant; died twenty minutes after birth.*

M. Depaul, at the *Société d'Emulation*, said that he had seen a woman aged twenty-four, eight months gone, brought to bed at L'Hôpital Clinique, on the 2nd September, 1850, after seven hours' labour, of a child who died twenty minutes after its birth.

Autopsy. The skin of the hands and feet presented a series of bullæ of pemphigus, of a particular colour. The lung contained numerous indurations, in the centre of each was a small collection of pus. The air could only enter a very limited portion of the pulmonary tissue. The thymus gland contained, also, a small quantity of pus.

The mother never suffered from syphilis; but the father, who some months before had contracted an indurated chancre, presented at the time of impregnation undoubted marks of secondary symptoms.

Case 3. *Syphilitic pemphigus in the newly-born child. Notes of the most remarkable cases read before the Academy of Medicine,* by Professor Paul Dubois.

A young girl, aged nineteen, presented herself at the Clinical Lying-in Hospital on the 22nd of last June, to be admitted; she was then about seven months gone. Eighteen months before we had admitted her, and she was delivered of a healthy living child, who died a few months afterwards of a gastro-intestinal affection. This time she requested to be admitted some time before the usual period that admissions took place, because she was otherwise ill. In fact, she showed me a

sore which occupied the middle portion of the lower lip. I learnt that this sore was of two months' standing, and that different plans had already been tried to cure it. As a natural consequence of this affection, I observed a swelling of one of the right submaxillary glands, a circumstance which I shall shortly again call to your recollection.

Whilst continuing the examination, I noticed that she had for some time lost some of her hair, her eyelashes, and eyebrows; that impetigo was very thick on the scalp, and that many of the posterior cervical glands were swollen and painful.

When this young girl was in bed, I was enabled to add to the foregoing phenomena, already very significant, a rose-coloured eruption which covered a great portion of the trunk and extremities, an ecthymatous pustule in its last stage was intermixed with the roseolous patches, also mucous patches on the vulva.

This case occurred some days after the lecture of M. Cazeaux, in which, as I now recollect, my opinion on the general syphilitic origin of pemphigus was combated. The thought struck me, apparently at that time with slight foundation, that this case which had offered itself of a pregnant woman, and tainted with constitutional syphilis, might, at a later period, throw some light on the subject of syphilitic appearances in newly-born children. Consequently, to add to my testimony, if there should ultimately be occasion, the weight of an authority of greater experience than mine in this matter, I thought it advisable that the patient should be submitted to the observation of a highly competent judge, and I asked M. Ricord to examine her. Our colleague acceded to my request with his usual courtesy, and came to the Clinical Lying-in Hospital. There a dresser, who was present during his examination, wrote from his dictation, and in the order that he confirmed them, the several lesions that I have described; and in order that his diagnosis might be very clear and might give rise to no dispute, our colleague definitively wound it up in these words: This woman is full of syphilis. I had also asked M. Ricord to express his opinion as to the probable date of the appearance of syphilis in this woman. She informed me that six months ago she had suffered from a chancre on one of the labia, and that the sore had existed for some time; I had concluded that this lesion was the primitive evil, and consequently the point of origin of the latter affections. M. Ricord, on the other hand, was of opinion that the sore on the lower lip was the original evil, and the cause of all the subsequent appearances, that this sore was a chancre in a healing state, and ultimately was transformed into a mucous patch. Our colleague was of opinion that the fœtus was already infected, if it were to be so, and that an antivenereal treatment would, very probably, be followed by no good result. I thought it right to conform myself to this opinion, and no specific treatment was employed. Nevertheless the patient complained some days afterwards of nocturnal pains in the head which were very severe; angina and a catarrhal inflammation of the pituitary membrane appeared. I was fearful lest our prolonged inaction should be prejudicial to her, and I prescribed for her proto-iodide of mercury in very moderate doses; unfortunately a very profuse and very troublesome diarrhœa came on almost at the beginning of the treatment. I thought it then prudent to suspend the use of all mercurials, and to substitute a medicine calculated to allay the new affection which had appeared. This continued notwithstanding the remedies; time slipt by, and the patient approached near her full time, without our being able to renew the antivenereal treatment. Labour pains came on the 7th of August, and birth took place under natural circumstances the same evening. Too great an interest was attached to the examination of the newly-born child not to conduct it with the greatest care. It weighed four and a half pounds, and its entire length was eighteen inches.

The weight and size of this child were decidedly less than the weight and size of the greater part of newly-born children; this diminution, when taken into consideration with the date of birth, which was anterior to that we fixed upon, left no doubt that it was prematurely born. Notwithstanding, it was well formed, very lively, and its plumpness was quite in proportion to its size. At the first glance it did not appear to have suffered from the disease with which its mother was so evidently affected, but on examining the external surface of the body, I was struck with the presence of several circular spots of a uniform redness, and plainly defined. One was situated on the sole of the left foot, another occupied the whole free extremity of the great toe of the same foot, a third was placed on the outer surface of the right heel; the surface of these spots was uniform, and the epidermis did not appear to have been at all raised. The following day, other similar spots appeared, one on the anterior surface of the little finger of the left hand, the other on the palm or surface of the same hand, near the thumb.

The third day, another spot larger than the others appeared near the malleolus of the left foot; lastly, two other smaller spots, but very well marked, showed themselves on the plantar surface of the left foot. Whilst these successive eruptions were showing themselves, the centres of the first two spots gradually acquired at first a whitish tint, then yellow; the epidermis became elevated, and the seventh day after birth this elevation, and the presence of a sero-purulent fluid, was incontestable. The original spots were only the first stage of the bullæ of pemphigus.

Notwithstanding these affections, from their small number and the small extent of surface would appear to be harmless, the child, doubtless labouring under some more hidden malady, became gradually weaker, in a short time it could no longer take the breast of its mother, who at first suckled it; a nurse came to her assistance, and it was surrounded with every variety of food that the most unbounded wealth could have provided. Its health continued, nevertheless, to decline, and when I sent it to our colleague, M. Ricord, that having verified the state of the mother he might also verify the state of the child, it expired in his waiting room. M. Ricord wished greatly to examine this little inanimate body, and he acquainted me with the result of his examination in the following terms: "The child who died at my house, whilst the mother was waiting for me, presented a patch occupying the external surface of the left heel. This patch, quite round, of the size of a quarter franc piece, grey, surrounded by a dark red areola, was formed by the elevation of the epidermis, and possibly by a sero-purulent fluid in small quantity, and had the appearance of a flattened bulla of pemphigus. On the internal surface of the lower part of the leg of the same side, a red circular blotch appears to be the commencement of an eruption of the same nature, but not as yet well defined; a similar blotch was present on the heel of the other foot. With this exception, I have not found on this child any other mark to connect it with a syphilitic origin, but it was only eight days old."

The autopsy was made eighteen hours after death. The extreme heat of the weather had produced a rapid change; notwithstanding this, it was easy to distinguish between the elevation of the epidermis over the principal bullæ, and a simple abrasion of the skin. But this autopsy interested us in another respect. You will remember that the origin of the discussion was a work of M. Depaul on the pulmonary affections of newly-born children, changes which he considered the result of a syphilitic infection. Now the mother of this poor child, in proportion as its health declined, observed and became anxious on account of the occurrence of paroxysms of suffocation, which became more frequent and violent;

the fears she expressed to me on this head caused me to suspect the coexistence of pulmonary lesions, and of congenital pemphigus, and the possible production of changes analogous to those indicated by M. Depaul.

The examination of the lungs was therefore made with a very pardonable curiosity. These organs inflated appeared to be permeated by air throughout their whole extent, and we were not able to detect any partial induration; nevertheless brownish spots in great numbers were scattered over the surface of the lungs. These spots having been incised, it was easy to see that they were the result of as many infiltrations of blood. Their thickness was several lines in the greater number of places, and of one third of an inch at the least in many others. The pulmonary tissue was entirely impermeable wherever these infiltrations existed; and as they were extremely numerous, it is allowable to suppose that they were the cause of the attacks of suffocation which occurred during the life of the child. I think it is also fair to consider these infiltrations as the first stage of inflammatory alterations, which have occupied a conspicuous position in the foregoing discussions. They indicated the first stage of these alterations in the same manner as the congenital spots represent the first stage of syphilitic pemphigus.

5th. On the transmission of the Syphilis of newly-born Children to their Nurses.

The fact of the transmission of the secondary syphilitic affections of newly-born children to persons who are about them, and particularly to the nurses who are charged with bringing them up and of suckling them, is not generally admitted. We may believe, but have no means of sustaining the point against those who would deny its existence. It is perhaps an opinion, but not yet an established truth.

Nevertheless this is a serious question, and the solution of which is highly interesting to public hygiène and to medical jurisprudence. It is not less important to prevent the syphilitic infection of hired nurses in the district establishments by the refusal of suspected children, than to indemnify her who has really contracted syphilis from an infected nursling.

There is no doubt but that a child infected with primary syphilis, the result of coming into contact with a diseased person, may in its turn transmit the infection to its nurse. There is in this nothing more than an established fact, which is included in the general laws of syphilitic contagion, and which cannot be disputed.

But congenital syphilis, hereditary syphilis, which shows itself only by secondary affections often very undecided, can it be communicated to the nurse? This is the real question, a difficult question which we have undertaken to resolve, by classifying the small number of facts that science has placed at our disposal.

The possibility of the transmission of syphilitic affections from newly-born children to their nurses has been mooted for a long time. Assertions that such may be the case are found in the works of some of the most ancient writers on syphilis, but whether this idea was with

them the result of theory, rather than of an attentive study of cases, they do not appear to have attached much importance to it.

In 1523, Jacques Catanée wrote: "*Vidimus plures infantulos lactentes, tali morbo infecto plures nutrices infecisse.** At a later date Nicolas Massa expressed the same opinion, without any more proof, and accidentally, whilst speaking on other subjects, as decidedly as Faguer, Doublet, and Bertin, of our own time, in their treatises on the venereal disease in newly-born children. Although lightly touched upon, these observations are not the less interesting, they at least prove that careful observations, verified by course of time, have been made on the subject. Bertin especially, whose work is very valuable, notices the fact of syphilitic contagion from nurslings to their nurses in the most explicit manner. It is one of the propositions at the commencement of this work, and it is extraordinary to find no further elucidation of the point in the course of his treatise which only contains one example of it, which is still less certain than probable.

Cullerier has attempted to repair the omission of Bertin, and to this end, he published in the *Journal of Medicine* a special treatise, followed by five cases in support of it. Unfortunately only one of them bears out the heading, and it is difficult to say from the others if it is the child which has infected the nurse, or the nurse the child. Nevertheless this work clearly exposes the views of the author and the cases which serves him as a basis cannot be impugned.

Hunter himself has recorded facts which proves the possibility of this contagion, but not being able to view them in their true light, on account of preconceived ideas, he has mistaken their nature, and has classed them under the unsatisfactory title of diseases which bear a resemblance to constitutional syphilis. These cases are not the less worthy of attention:

Case 1. *Syphilis communicated by the child to its nurse.* A female infant, aged two months, the issue of syphilitic parents, was intrusted to a hired nurse. Pustules made their appearance on the labia and anus. The nurse was healthy, and had at that time no eruption on the nipples, parts of generation, or body. At the end of eight days the symptoms in the children were well defined, and ulcers were apparent on the breasts of the nurse. The child was then taken away, and a gratuity was given to the nurse to enable her to get herself cured.—(Cullerier, *Journal de Médecine.*)

Some years since, M. Bouchacourt published an analagous case, reported in the *Revue Médicale*, and he drew the just conclusion, that syphilis in a newly-born infant can be transmitted to its nurse. The following is the case:

Case 2. A child, aged two months, nursed up to this time by a young woman, who, at the end of some days, fell ill, and ulcers appeared on both breasts, the

* *Tractatus de morbo gallico.*

glands of the head and neck were swollen, was taken back by its parents to be placed with another nurse. Its face at that time was swollen and covered with sores, the nostrils occluded by discharges, and it was unable to cry.

The nurse, who took charge of it, was healthy, the mother of four children, and her youngest, who was a year old, was in very good health.

After six weeks of nursing, this woman in her turn noticed the appearance of some small pustules, fissures, and ulcers around the left nipple; the glands in the axilla became swollen, one of them became hard and painful; her own child's face was soon covered with pustules, and its lips excoriated; it had also purulent ophthalmia, and, at a later period, pustules on the back, nape of the neck, the chest, and around the anus. Her eldest daughter, aged twelve, who had the care of, and who daily frequently caressed, the little strangeling, was also affected; she was attacked with acute inflammation of the mouth, with ulceration of the buccal mucous membrane.

The nurse placed herself under treatment, her genital organs were examined, and also her husband's, which were normal, and not marked by cicatrices. Notwithstanding, the surgeons were agreed that there was not the slightest doubt of a syphilitic affection; she was treated for it and was cured.

Here, then, was a child who had successively infected both its nurses, which, at the same time, was the cause of a similar infection in two strangers who were brought into contact with it.

We might classify with the first case three cases published by Dr. John Egan, in the *Dublin Journal*. I brought them forward in my treatise of 1850, *On Syphilis in New-born Children*, but they are deficient in detail, and it appears to me that there would be no advantage in republishing them. The following is a far more important case, which has been communicated to me by M. Rayer:

Case 3. At the commencement of the present year, a surgeon in Paris brought under M. Rayer's notice a young female who was the subject of secondary affections, *i.e.*, there was an eruption of copper-coloured spots, situated chiefly on the trunk, on the forehead, and under the hair; mucous tubercles, to the number of two around each nipple, and swelling of the lymphatic glands of the axilla and nape of the neck, and, lastly, ulceration of the soft palate.

According to the account given M. Rayer, this young woman, of good character, and married to an industrious artizan, was confined some months before with a healthy child, being herself in excellent health.

Some weeks after her confinement she lost her child, from an acute disease, suffering from sores on the nates and scrotum, excoriations around the commissure of the lips, and a purulent discharge from beneath the eyelids. Eight days after the commencement of this fresh suckling, there appeared, on both the nipples of this woman, swellings, followed by ulceration, which made nursing painful, the glands of the axilla were swollen, but the nursling (in whom the eruption and ophthalmia continued) soon died. The ulcerations on the breasts were cured in about a month, by the sole employment of soothing lotions. But a month and a half after this, an eruption appeared on the skin, small tuberculiform patches appeared on the nipples, and, as we have mentioned, ulceration attacked the throat; treated with Feltz's mixture and Sédillot's pills, two at first, and afterwards three daily for a dose, the syphilitic eruption and ulceration of the throat had

entirely disappeared after a month of this treatment. It was continued some little time longer to ensure the cure.

In this case the probability in favour of the transmission of syphilis from the nursling to the nurse is great. The surgeon had declared that this woman and her husband were healthy at the time the woman was confined, that the child she brought forth was healthy and free from eruption, that the nursling of which she took charge had a pustular eruption on the nates and purulent ophthalmia; that the ulcers first appeared on the nipples, that the lymphatic glands in the axilla were next swollen, that those of the groin were perfectly healthy, that the syphilitic eruption and the ulceration of the throat appeared about a month and a half after the abrasion of the nipple. There is in all this, I repeat, very great presumption in favour of this idea; but in case this woman should have meditated bringing an action for damages against the father of the nursling, the medical jurist who was consulted ought certainly to have asked himself the question, if this woman might not have contracted syphilis by the genital organs prior to or after her confinement. A declaration attesting the moral character of the husband would not have been sufficient; he must have examined her, and looked for the presence of any suspicious cicatrices on the parts of generation or the groins. It would most especially have been quite indispensable to make a minute examination of the genital organs of this poor woman. Once more, we repeat, the disease in the nursling and the progress of the disease in the woman (supposing the information in this respect to be correct), render it very probable that in this case the syphilis was transmitted from the nursling to the nurse.

There is another case that I noticed, under the care of M. Rayer himself, at La Charité. It is a case of syphilis occurring in a woman who nursed a suspected child; but the proofs of transformation of the disease by the nursling are not very strong.

Case 4. A woman, aged twenty-eight years, married, was admitted under the care of M. Rayer, into L'Hôpital de la Charité, on the 20th of January, 1848; of general good health, and for many years married, she declared that neither herself or husband had ever had either chancres or a discharge from the parts of generation.

Eleven months since she was confined with twins, a girl who survived four days, and a boy whom she nursed for seven months. At the end of this time she took charge of a nursling, newly-born, which she suckled conjointly with her own child. The nursling was to all appearance healthy when she took charge of it; but a fortnight afterwards she noticed that its upper lip and the commissures of the lips were chapped, and covered with ulcers which discharged, soon they appeared on all the parts of the face; there was a discharge from the eyes, the eyelids were glued together, and a reddish discharge exuded from the nose; crusts formed around the nostrils; next on the nates and on the legs. The woman stated that coagulated blood proceeded from the ulcers and crusts.

She nursed this child for seven weeks; it died in October, 1847. During these seven weeks she continued in good health.

Fifteen days after the death of the nursling, this woman noticed the presence of small red elevations around the nipple; these elevations became excoriated, and discharged a sanguineous fluid, in two or three days the nipples became chapped, and she was obliged to give up nursing her own child, who *appeared to suffer in its throat*, swallowing with difficulty, but having neither ulcers nor spots on its body.

About a week after the appearance of the elevations around the nipple, the glands of the axilla enlarged, became very painful, and rendered it impossible for her to move her arm; in the meantime an eruption like measles appeared over the whole body, which disappeared in three or four days, to be followed by the one which was present at the time of her admission into the hospital, and which presented the characters of a syphilitic squamous affection (psoriasis syphilitica). This eruption, at first limited to the neck, shoulders, and chest, at a later period reached the scalp; the hair has begun to fall off, and the cervical glands are swollen. There was never any swelling of the lymphatic glands of the groin.

When admitted into the hospital, the syphilitic patches were very numerous on the back, and there were numerous syphilitic ulcerations present at the back of the mouth.

This woman was treated with Sédillot's pills, and with Feltz's mixture. On the 12th of March, the ulcerations of the mouth were healed, the glands of the mouth no longer swollen; the eruption consisted only of slight spots, like those that often remain long after the cure of syphilitic psoriasis.

This woman was considered as being of irreproachable morals by the surgeon who first attended her, and he had no doubt of the transmission of syphilis by the nursling. Frequently M. Rayer considered it indispensable to carefully examine the genital organs of this woman, but she objected, notwithstanding his representations, to such an examination, which she considered as a species of degradation. No examination could be made of the child, or of the nursling which had died, nor of the husband, who did not live in Paris; in fact, in recapitulating the particulars, this case may be said to be one of the numerous examples of secondary syphilis *after nursing a suspected infant*, but without positive proof of syphilis in the child, and consequently without evident transmission of the disease, to the exclusion of all other channels by which the nurse might have been infected.

There is another case in my possession, which is very interesting.

Case 5. Some days since I saw a child of two and a half months old, it had been nursed by its mother and was the subject of numerous ulcers, not of great depth, red at the base, and of variable size around the penis and anus; these ulcers were like those produced by excoriation of the skin through dirt. The child had no marks on its body or inside the mouth, it was also very puny, and its mother determined to place it under the care of a country nurse.

The nurse was twenty-five years old, the mother of four children, the youngest being a year old; she had never been the subject of any cutaneous affection; she had lived quietly in the country with her husband, a respectable man, strictly moral, and in whom she placed the most implicit confidence.

Fifteen days after she had received this nursling, after being bitten on the left breast by her own child, the nipple of that breast became sore and ulcerated. At a later period pimples appeared on the body and the external parts of generation. She continued to nurse her child, it had also pimples on the nates and around the anus.

Frightened by these affections appearing after the arrival of the diseased nursling which had been intrusted to her, fearing that she was the cause, and disheartened that it did not thrive like her own children, she returned it to its parents at the end of two months.

She then paid attention to the restoration of her own health, for she had several mucous patches at the back of the throat, syphilitic papulæ over the whole body, mucous patches on the external organs of generation, and in addition to this an enormous ulcer which had destroyed the whole of the skin of the left nipple. I examined the husband, no disease was visible on his body or on his organs of generation, no vestiges of an old cicatrix, and he assured me that he had never contracted syphilis, and had always been faithful to his wife.

Whatever the truth may be, I prescribed an antisyphilitic treatment to be followed for two months. Sedillot's pills, two daily, were the principal remedies. The patient was cured.

In this case the nurse was infected, of that there is no doubt, but the point to be decided is the origin of the disease. The husband cannot be held responsible; he was fortunate in encountering the danger without catching the disease. The wife, it is true, might indeed have suffered from syphilis from an indiscretion of which she might have been guilty, but from her answers I do not think that at all probable. That she denied the charge proves nothing, I know, but as she did not demand money in compensation for the injuries she had received, as she evinced no fear of her husband, whom she appeared to rule, the circumstances of the case being such as would have disposed her to conceal the cause of her malady, it is reasonable to place some faith in her answers; more, I questioned her when alone, and she replied to me with such answers that there would have been no more shame in confessing the delinquency had she been capable of committing it. She appeared to disguise nothing. On the other hand, a sick child and one justly suspected arrives; soon after, she and her child fall ill, present incontestable marks of secondary syphilis, and she dates her malady from contact with the strange infant. It is far more probable that this woman is right, at least I agree with her in this opinion; but between this probability, however great it may be, and an absolute certainty, there is still an immense hiatus that other cases alone can fill up.

Case 6. *Syphilis transmitted by the child to the nurse.* A child was accused of having transmitted the venereal disease to its nurse.

The father contracted gonorrhœa two years before his marriage, and fourteen years before the birth of the child.

The mother was delivered of her first child, and subsequently of a second, who were born healthy. The third was born dead at five months. The fourth was

prematurely born at seven months, scarcely covered by cuticle, affected with dysentery, and it died almost immediately. The fifth was born at eight months, very weakly, and after some days, numerous vesicles, filled with a transparent purulent liquid, appeared on the body and inside the mouth. It died at the end of three weeks; they had placed it under the care of a nurse. This nurse, soon after the child's death, was attacked with *ulceration of the nipple*, then the *glands* in the axilla became affected, next a *bad sore throat*, but without any local lesion, next an *eruption on the skin*, with desquamation of the cuticle of the hands and fingers, next *onychia with loss of the nails* of the fingers and toes.

Hunter, in his observation* which I have just analyzed, denies the existence of syphilis in the infant or the nurse. In the latter, he even goes so far as to attribute to mercury, the ulceration of the fingers and the falling off of the nails. But I may observe, that Hunter, whilst denying the existence of syphilis, could not say what the disease was that was under his notice. If it be not syphilis, call it what you will.

Syphilis from the infant to the nurse. Here is another case of Hunter's,† which this great surgeon placed under a heading where it was very difficult to discover it, and which is disguised under the title of *Diseases which resemble Syphilis.* Hunter possessed all the weaknesses of those systematic men who throw aside whatever troubles them. A case is met with which scarcely agrees with their theory, it is the case which is irregular, and is an instance of one of nature's freaks. Thus reason authors on nosology:

Case 7. A lady nursed two children, her own child was suckled at the right breast, the other at the *left.* At the expiration of six weeks, the *left nipple* ulcerated, and passed through the different stages of the disease. Cicatrization took place three months after the commencement of the affection. At that time the strange child had impeded respiration, aphthæ in the mouth, and died of consumption, its body covered with ulcers. Shortly after this, the nurse was attacked with lancinating pains in different parts, and had on the arms and thighs an eruption of mucous tubercles, many of which became ulcers. She was placed under a mercurial treatment.

Three years afterwards she became the mother of a child, who had the cuticle detached in several places, and a squamous eruption on its body; it died at the end of nine weeks. It had been placed in charge of a nurse. The nurse a short time afterwards had cephalalgia, sore throat, and ulcers on the breasts. She became an inmate of a hospital, was treated with mercury, and went out at the end of some months not cured. The bones of the nose and palate bones exfoliated, and some months afterwards she died of consumption.

The lady was treated by sea bathing, and Lisbon drink; the ulcers on the arms and nates were cured in a month. A year afterwards she had another very feeble child, it died before the end of the month. Lastly, after ten months, the ulcers broke out afresh, suppurated for a year, and then disappeared permanently.

* *Op. cit.*; p. 571. † *Op. cit.*; p. 772.

What is this, then, but a disease transmitted by a child to the breast of a woman, infecting her organism, producing patches on the skin, being the cause of the birth of a child affected with ulcers, which child infects another nurse, in her breasts, throat, bones, and, in fact, every part of her, so as to cause her death? What is it, then, if it be not *syphilis*, or *syphiloid* disease?—a word which Hunter has searched for without being able to meet with it, for his opinion was, in speaking of this case, that every day new poisons were produced which greatly resembled the venereal poison, so that it follows that we must judge them not by their points of resemblance, but by their points of dissimilarity.

There is another case of Hunter's, resembling syphilis, and not being syphilis.

Case 8. A child, born of apparently healthy parents, was given in charge to a nurse three weeks after its birth. Its skin was desquamating in some parts, and it had excoriations around the anus. One would have said that the part had been scalded. There was also abrasion of the lips, and aphthæ in the mouth. It died at the end of a fortnight, having only sucked from the left breast.

The nurse continued to suckle her own child, and went to the city to look for another nursling. At the end of a fortnight, and five weeks after the death of the first nursling, she had ulceration of the left nipple, and two days after this an eruption, which lasted a fortnight, on the body, the arms, and nates. This eruption was similar to small pox.

At this time a gland in the axilla suppurated, was opened, and rapidly healed.

On the other hand, some pustules of the cutaneous eruption became large ulcers and were covered with crusts, next an ulcer appeared on the left tonsil, and she was placed under mercurial treatment for six months. Hunter stopped it, and the nurse for the time was cured. At a later period she had an abscess of the breast, near the nipple, and a fresh eruption on the face; at last they both disappeared.

The child had been taken away from this nurse five days after the appearance of the eruption, and given to a second nurse. It had, at the end of some days, a pustular eruption on the head, and excoriations in the mouth, which prevented it sucking; it had an eruption on the face, the knees, and feet, during three months. They took it to London, without submitting it to any treatment; it was placed under the care of a third nurse, and rapidly became well.

This nurse had also inflammation of the breast, an ulceration on the nipple, and likewise an eruption on the nates and limbs. She got well without treatment. Her milk failed; but to quiet her own child, she placed in its mouth the nipple of the breast that had been diseased. This child became ill with the same symptoms as the nursling. Both took mercury and were cured.

The third nurse, like the preceding, was in a short time affected, but the spots showed themselves in fewer numbers; it might be said that the disease had lost much of its virulence, for each new infection presented a less malignant character than the preceding. The disease was cured without treatment.

What then, again, is this disease communicated by a child to three nurses successively, and to the child of one of these nurses? What

* *Op. cit.*; p. 776.

name is to be given to this *new poison*, capable of being transmitted in the same manner as syphilis, without being syphilis? Why, one might, after the example of Hunter, acknowledge that the fact puzzled us. Shall we call it syphiloid disease? But this term is nothing more than a mask to conceal ignorance. We prefer, by force of analogy, to see in this case an example of secondary syphilis transmitted by inoculation from the newly-born child to its nurse.

Case 9. *Syphilis from a newly-born infant to its nurse.*—(*Gazette Médicale*, 1851.) In March, 1844, a newly-born child, the issue of a mother affected with constitutional syphilis, weak, puny, having ulcers in the mouth and back of the throat, copper-coloured spots on the skin, was brought to M. Petrini of Turin. It became affected with marasmus, and died in three months.

A hired nurse had the charge of suckling it, but observing it grow weaker, she requested two of her friends, sisters, both nurses, to give her nursling the breast.

These had shortly both of them ulcers on the nipples, at a later period, pains in the bones, next, ulcers on the genital organs. They infected their husbands. Their two children had in their turn ulcers of the mouth, or the isthmus faucium, and ultimately sank under these affections.

Simple local treatment restored the husbands to health; they had no sequelæ of a venereal nature.

As to the two mothers who were affected, one recovered her health completely, and the other was cured at the end of several months, after numerous complications, and with the loss of an eye from syphilitic iritis.

What is most astonishing in this case is, that the first nurse escaped the contagion; but it is well known that the mode in which syphilis is transmitted is not necessarily always the same. Again, it is possible that the nurse, taking precautionary measures against the danger, was willing to avoid it, by throwing on her neighbours the duty of suckling her nursling.

But what is quite certain is, that two women, after giving the breast to an infant affected with constitutional syphilis, had—1, ulcers on the nipples; 2, pains in the bones; 3, ulcers on the parts of generation; 4, communicated the same disease to their husbands; 5, infected their children, who died from it.

The obstinate would say that these two women had deceived their husbands, that they had contracted chancres otherwise than from the child intrusted to their care, that they had had constitutional syphilis, subsequently consecutive affections of the nipples, of the bones, of the organs of generation; that the husbands had also acquired their chancres away from home, that they falsely accused their wives, who having secondary symptoms, could not communicate a primary disease; that the children must necessarily inherit this syphilitic taint, and that this is the clearest and simplest manner of explaining the case of M. Petrini, who was mistaken, and unaccustomed to witness cases of this nature.

We do not share this opinion, and we consider this case a very proper one to class with those that we have already reported.

Case 10. (Extracted from the *Gazette des Hôpitaux*, 1851.) A little girl, covered with an eruption which was considered syphilitic by the surgeons of the Meaux Hospital, was put out to nurse at Ferté-sous-Jouarre, at Madame Follet's.

This woman having had consecutively pains in the breasts, next ulcerations, and at a later period angina with ulceration at the back of the throat, was examined as well as her husband, and no old or recent traces of primary syphilis could be discovered. The surgeons at Meaux concluded that syphilis had been communicated to her by the nursling, and the court having been appealed to to assess the damage done to the nurse, ordered her 2,000 francs damages in spite of an opposite opinion from M. Ricord.

Case 11. (Extract from *Bulletin de Thérapeutique*, 1851.) A woman at twenty-two, married, the mother of a healthy child, having suckled a strange infant, who remained in perfect health, took another nursling who had a pustulous eruption on the nates and the inside of the thighs. The eruption spread all over the body, and was declared to be of a syphilitic nature, by a surgeon who advised the child to be restored to its parents. This advice was followed and the child soon fell a victim to the disease.

This woman had kept the nursling seven weeks, and ten days after sending it back a small ulcer appeared on the left nipple, next sore throat, and at the same time pimples on the genital organs.

M. Caradec, of Brest, having been called in to the patient, observed an ulcer almost cicatrized, without induration on the nipple of the left breast; syphilitic roseola very plain about the body, mucous patches very abundant on the genital organs, both on the inside and outside of the thigh, on the nates, and the head, slight swelling of the axillary glands; lastly, a deep redness of the back part of the mouth, and a small greyish ulcer on each tonsil.

M. Caradec did not find on the genital organs of this woman any suspicious cicatrix, and it was the same with the husband whose organs were most scrupulously examined.

This woman was submitted to a specific treatment: sarsaparilla and the proto-iodide of mercury cured her completely.

Thus, here is a woman, who, after seven weeks of daily contact with a syphilitic child, finds herself attacked with ulceration of the breast, then with angina, then with syphilitic roseola, then with mucous patches, and neither she nor her husband have, on their parts of generation, any suspicious cicatrix of a former chancre.

The nature of the phenomena are not doubtful, their order of succession very well marked; it is constitutional syphilis originating in a constitutional syphilis, and transmitted from the nursling to the nurse.

[Wiseman (*Chirurgical Treatises;* book vii, p. 4. London, 1676) has also observed that "nurses may either infect children, or be infected by them. Children that have no ulcers in their mouths or lips, nor any other visible symptom of the *lues*, have, notwithstanding, betrayed their own infection by transmitting it to the nipples of the nurse; in which case it is frequent to see serpiginous ulcers arise one after another, growing at length into so many round, crusty ulcers: also

nodes thrusting out of the back of the hands, shins," &c. He records two cases in point, of nurses who had become diseased in this manner. "A nurse, by giving suck to a diseased child, was infected with great ulceration and chaps with verucæ on the nipples and parts about the breasts, upon which account the child was taken from her, it being suspected that she had infected the child. She had also a node on the right hand, and some breakings out upon the limbs. I, inquiring into the cause, saw this poor woman's child, which was born within the year, very well complexioned and sound."—(*Ibid;* book vii, p. 29.) It was, therefore, concluded that the disease existed originally in the foster child. A similar case occurs in the same volume. "A nurse was brought to me, who, by giving suck to a diseased infant, had the nipple and parts about the right breast very much excoriated, and four round, hard, crusty ulcers, somewhat more distant. She had a node, with pains on her right leg, also a *serpigo* on her right hand and fingers. She had not been troubled with a gonorrhœa, nor was the *pudendum* even diseased, which confirmed to me that she had gotten the infection by suckling the child.—(*Ibid;* p. 33).

Various ancient authors have alluded to this mode of contamination, and Astruc (*De Morbis Veneris;* lib. ii, cap. i,) says there can be no doubt as to the frequent occurrence of transmission by means of lactation.

Dr. Barry (*Medical Essays and Observations;* vol. iii, No. 21) has noticed the rapid and destructive course which the disease thus communicated appears disposed to run, and Vercellon (*De Morbis Pudendarum;* cap. iv, p. 205) gives an account of a whole village having been more or less infected, from several charitable women, moved with compassion, having given their breasts to two foundling infants infected with venereal disease, and a similar and very remarkable instance is narrated by Portal (*On the Nature and Treatment of some Hereditary Diseases; Medical Journal;* vol. xxi, p. 251) as having occurred at Montmorency. An infant infected with syphilis, was taken from Paris, to be nursed by a woman of that place. The disease was communicated from the child to its foster-parent, from the latter to her husband, who infected another woman, and in a short time the whole town became more or less infected. Cases related by Mr. Hey (*Medico-Chirurgical Transactions;* vol. vii, 1816), besides illustrating the possibility of syphilitic inoculation by mamillary absorption, tend to demonstrate the elective determination observed in the appearance of some morbid principles; thus the poison of syphilis exhibits a constant tendency towards the genital organs, although introduced into the system by another channel.

Dr. Colles (*On the Venereal Disease;* p. 272) has recorded an instance in which the disease was communicated by lactation. A woman who had her own infant at the breast, and having an abundance of milk, was induced to suckle another infant, and continued to do so until it died at the end of three weeks. "The manner of its death, and the state of its body, as related by the woman, leave not a doubt that this infant was affected with syphilis. Previous to her reception of the child, she and her own infant (then four months old) were in perfect health; about the time of the death of the strange infant, a sore appeared on her breast, near the nipple; and not long afterwards an eruption occurred over various parts of the body, preceded by the customary febrile symptoms. Not being aware of the nature of her illness, she did not apply for medical advice; and she has remained up to the present time without treatment; the eruption fading in one place, and then reappearing in another. Her throat, also, has laterally become affected; it presents a deep red appearance, but there is no ulceration to be seen; the angles of her mouth are also affected by fissures; at this period of the complaint, seeing that matters were going on from bad to worse, she determined on coming into the

hospital. She has had but one other child, now two years old, stout and healthy. The infant, now ten months old, is not at all emaciated, but of a pale and sickly appearance. Several parts of its body are covered by a copper-coloured eruption, slightly raised and smooth ; this particularly affects the parts of generation and the neck ; it became affected nearly at the same time with the mother."

Whitehead (*On Hereditary Diseases;* p. 174) relates an interesting case of secondary syphilis communicated by vaccination, the case of the mother who suckled the child proved to be one of a very distressing kind. The breasts, with the nipples and superficial absorbent vessels, became so inflamed as to necessitate the discontinuance of their use in nursing. The disturbance was most severe on the left side, extending to the axilla, in which situation an extensive abscess formed, which gave exit to an incredible quantity of offensive purulent matter. As the abscess contracted, blotches of roseola came out in various parts of the body, and these continued for a considerable period, varying with the state of functional health prevalent at the time ; but she was ever afterwards an invalid.

A writer in the *British and Foreign Medico-Chirurgical Review*, 1852, vol. ix, p. 327, narrates the following case : A gentleman had a chancre six months before marriage, for which he took mercury and was cured ; and his marriage was permitted by a surgeon of high reputation. The wife bore two children, both of whom pined away and died. She had recently been confined with a third child ; but as it was supposed that her milk was not good, a healthy young woman had been engaged as a wet nurse. In a short time her left nipple became very sore, and deeply ulcerated, and resisted various efforts to cure it, so that at last she was obliged to abandon her charge. Another nurse was sent for in her place, who became affected in a similar way ; and it was at this time that we first saw the case. On examining the child, who was beginning to emaciate, we found marks of syphilitic Lepra about the nates and legs, which had not been suspected ; and on inquiry it was ascertained that the former children had had cutaneous eruptions. On cross-questioning the husband, we found that three months after marriage he had had sore throat and a dark red eruption, principally at the edge of the hair at the back part of the head, which had never entirely left him. The palm of the right hand had, at the time we saw him, a mottled aspect, and the skin was desquamating ; and some small circular copper-coloured spots were visible on the thighs. The wife's health had been ailing, but she had not manifested any notable symptom of syphilis. The sores on the nipple of the nurse we saw had an angry look, with indurated margins. The surface of the mammæ for a considerable distance around them was inflamed, and an abscess eventually formed in the gland itself. The whole of this family—husband, wife, child, and nurse—were treated for syphilis.

Acton (*Practical Treatise on Diseases of the Urinary and Generative Organs, &c.;* p. 632, 1851) records the following case as an instance in which the mother was probably contaminated through the placental circulation, but it is rather to be regarded as an instance of infection from the mouth of the child through the nipple, as the mother had remained healthy until some time after the birth of the child.

July, 1850. A gentleman twenty-eight years of age came to me to-day complaining of a sore tongue. On the left side of the organ a white spot as large as a threepenny piece, looking like a cicatrized ulcer, has broken out ; on the lip there is a similar spot, but the surface is quite level.

"His history is the following : Two years and a half ago he contracted syphilis, secondary symptoms followed. During the time he laboured under the complaint his wife became pregnant, went her full time, and the child was born healthy. A few weeks after birth it showed symptoms of secondary syphilis, spots at the corners

of the mouth, and on the palms of the hands; the mother, who had been perfectly healthy up to this time, then (some months after her confinement) had unequivocal marks of secondary symptoms; no sore breasts, but Psoriasis palmaris."

The observations of Calderini and Rizzi at the Milan hospital seem to put beyond all question, not only the possibility but the frequency with which children give the disease to wet nurses, and these to their husbands. Of 1050 syphilitic women, 266 gave birth to infected children. The disease most frequently communicated to the nurse was "tuberculous syphilide" of the mammæ. In 100 cases this occurred alone in 34, with angina in 19, and with other symptoms in 47 cases. Of these 100 women, 19 infected their husbands, chiefly with tuberculous syphilide of the penis, scrotum, and perinæum.—P.H.B.]

Such are the facts that can be brought forward in favour of the transmission of the syphilis of newly-born infants to their nurses. They are not certainly all of equal value, nor of the same degree of importance; they cannot all equally conduce to the solution of the question. For this they must be divided and classed according to their value.

Some of them, as those of Hunter, Cullerier, and Bouchacourt, present marks of identity which admit of no doubt regarding the origin of the contagion; these are the most important; others, on the contrary, analogues to the last case I reported, and amongst which we find those of Bertin and M. Rayer, only afford great probability in favour of contagion by the child, but perhaps do not demonstrate it in a very decided manner. Lastly, a great many are deficient in the most important details, represent only an opinion quite devoid of proof, and cannot be admitted.

It is by throwing aside this last category of cases, and only consulting the two others, where are found ranged the most certain and the most probable cases, that we are of opinion we may conclude by stating;

That syphilis may be transmitted from the nursling to the nurse.

THE END.

Formulary of Medicines

ADMINISTERED

IN

THE DISEASES OF CHILDREN.

As it is known, the dose of medicines varies according to the age, sex, and constitution of the individuals. The following, as respects the age, is the table of reduction proposed by Gaubius.

Supposing a medicine is given to an adult in a dose represented by unity, we should give to a child

Below 1 year	$\frac{1}{15}$ to $\frac{1}{12}$
At 2 years	$\frac{1}{8}$
At 3 years	$\frac{1}{6}$
At 4 years	$\frac{1}{4}$
At 7 years	$\frac{1}{3}$
At 14 years	$\frac{2}{3}$

In this formulary it will generally only be a question of the dose of medicines suitable for infants and children at the breast.

1. EMOLLIENT BATH.

Various emollients, ℥ xvii; linseed, ℥ iij. Boil in 5 pints of water. To be put in the water of the bath.

2. AROMATIC BATH.

Species aromaticæ,* ℥ xvii; water, 3 pints. Boil and use as a bath. In scrofulous rickety children, and in all cases of cachexia.

3. SULPHUROUS BATH.

Dry sulphuret of potassium ℥ j to ℥ iv. To be put in the water of the bath, the quantity of which should not exceed 20 to 34 pints. In scabies, in chorea, and in certain nervous affections.

4. ANOTHER.

Liquid sulphuret of potassium, ℥ iiss to ℥ vii; warm water, q. s. Mix.

5. ANTISPASMODIC BATH.

Infusion of ℥ j of valerian root, for a bath. In certain cases of essential convulsions, and particularly in what is termed eclampsia of infants (Trousseau).

* This includes various species of the natural order Labiatæ, as sage, mint, rosemary, balm, marjoram, &c.

6. BATH OF CORROSIVE SUBLIMATE.

Corrosive sublimate, 3½ to 15 grains; alcohol, ℥ ij; distilled water, ℥ j. Dissolve and put into the bath. In diseases of the skin and in syphilitic affections (Trousseau).

7. ASTRINGENT BATH.

Sulphate of iron, ℥ x to xv. Dissolve in the bath. In diseases of the skin and in the erysipelas of young children.

8. ANOTHER.

Sulphate of alumina and potash, ℥ xii to xx. To be dissolved in the bath.

9. BATHS FOR THE FEET.

Soap and water, water with bay salt, fresh wood ashes, flour of mustard, hydrochloric acid, &c., are indifferently used for this purpose.

10. POWDER FOR DRESSING CHILDREN.

Powdered marshmallow, to be used as a powder.

11. ANOTHER.

Lycopodium powder, scented with essence of roses. This powder is much to be preferred to the preceding. Water glides off it without mostening it.

12. ANOTHER.

Powder of old dry wood.

13. AROMATIC LOTION FOR THE SKIN.

Water, ℥ j; tincture of benzoin, gtt. xv. Mix. In cutaneous eruptions.

14. ASTRINGENT LOTION.

Take of the liquor of Van Swieten, ℥ ij.* To be used with a piece of linen or with a toilet sponge. In "gourmes" of the head, of the eye, and in cutaneous eruptions.

15. EMOLLIENT COLLUTORY.

Honey, ℥ j; decoction of marshmallow, ℥ iv; dissolve. To be applied to the mouth with a brush. In simple stomatitis, in aphthæ, and in the irritation of the buccal mucous membrane which accompanies dentition. In young children, collutories are very preferable to gargles.

16. ANTISEPTIC COLLUTORY.

Decoction of bark, ℥ iss; syrup of orange peel, ℥ j; chloride of soda, ℥ iss. Mix. In cases of ulcerous stomatitis.

17. DETERSIVE COLLUTORY.

White honey, ℥ ss to ℥ vj; hydrochloric acid, ℥ iss. Mix and agitate. In cases of ulcerous stomatitis, aphthæ, gangrene of the mouth, thrush, &c.

18. ASTRINGENT COLLUTORY.

Honey, borax, of each equal parts. In aphthæ, thrush.

19. ANOTHER.

Honey, 3 parts; borax, 1 part. In thrush.

* The liquor of Van Swieten is thus composed: bichloride of mercury, 1; distilled water, 900; alcohol, 100. Dissolve the bichloride in the alcohol, and then add the distilled water.

20. ANOTHER.

Honey of roses, ℥ j; sulphate of alumina and potash, 30 grains; distilled water, ℥ ss. Dissolve. In aphthæ, thrush.

21. DRY COLLUTORY.

Dry chloride of lime. To be applied to the diseased parts with a slightly moistened brush, and some mucilaginous liquid injected soon afterwards. In gangrene of the mouth.

22. COLLUTORY OF NITRATE OF SILVER.

Nitrate of silver, 2½ to 45 grains; distilled water, ℥ j. Dissolve. In aphthæ, thrush.

23. ANOTHER.

Syrup of mulberries, ℥ j; honey of roses, ℥ ss; borax, 30 grains. In aphthæ and thrush at the commencement of the disease.

24. POWDER FOR CHILDREN IN ACIDITY OF THE ALIMENTARY CANAL.

Calcined magnesia, ℥ j; rhubarb root, ℥ ijss; valerian, 30 grains; oleo-saccharate of fennel, ℥ ss. Mix. To form a powder; about 6 grains to be taken once or twice a day (Hufeland).

25. ABSORBENT DRAUGHT.

Powdered crabs' eyes, 30 grains; lettuce water, syrup of rhubarb, of each ℥ j. Mix. Shake well and give a teaspoonful every hour. In diarrhœa.

26. ABSORBENT POWDER FOR NURSES WHEN CHILDREN HAVE DIARRHŒA.

Carbonate of magnesia, ℥ v; fennel seeds, orange peel, sugar, of each 30 grains. Mix. Make a powder; a teaspoonful morning and evening.

27. ASTRINGENT DRAUGHT.

Extract of rhatany, 7 to 15 grains; distilled water, ℥ ij; mucilage, ℥ j; syrup of marshmallow, ℥ j. Mix; a teaspoonful every two hours. In diarrhœa.

28. ASTRINGENT DRAUGHT.

Tannin, ¾ grain; tincture of the tartrate of iron, ℥ iss; syrup, ℥ vj; distilled water, ℥ j. In diarrhœa (Trousseau).

29. ANOTHER.

Julep, ℥ ij; add from 2 to 15 grains of the extract of rhatany. In diarrhœa.

30. ANOTHER.

Nitrate of silver, .15 to .30 grain; syrup, ℥ vj; distilled water, ℥ j. Dissolve. In entero-colitis (Trousseau).

31. ABSORBENT MIXTURE.

Powdered magnesia, 3 to 6 grains; syrup of gum, ℥ j. Mix; a teaspoonful every two hours. In diarrhœa.

32. ANOTHER.

Subnitrate of bismuth, 2 grains; powdered sugar, 7 grains. To be taken in preserve. In diarrhœa.

33. ANTISPASMODIC DRAUGHT IN COLIC.

Lettuce water, ℥ ij; simple syrup, ℥ vj; magnesia, 4 grains; laudanum, 2 to 3 drops. Mix and shake. A teaspoonful every hour. In colic, and in diarrhœa with green stools.

34. COMPOUND IPECACUANHA SYRUP.

Grey ipecacuanha, ℥ viii; senna, ℥ xxiv; wild thyme, ℥ viii; corn poppy, ℥ iv; sulphate of magnesia, ℥ xxiv; white wine, ℥ xxvi; orange flower water, O iss; water, O vj; white sugar, ℔ xvi.

This syrup is now very much used amongst children in hooping cough and in catarrhal affections. It is given in the dose of one teaspoonful, three or four times a day.

I have, up to the present time, advantageously replaced it by the following syrup:

Syrup of ipecac., ℥ iss; compound syrup of chicory, ℥ vi; lettuce water, ℥ iss; orange flower water, 10 drops; laudanum of Sydenham, 5 drops.* A teaspoonful three or four times a day for children of one year old. In hooping cough and in catarrh.

35. PURGATIVE EMULSION.

Almond emulsion, ℥ iss to ℥ iij; syrup of white roses, ℥ vj to ℥ iss. Half to be taken in the evening, and half in the morning. As a slight purgative.

36. SYRUP OF PEACH FLOWERS.

This syrup is given to children when it is desirable to keep the bowels freely open. It is given in the dose of two or three dessert spoonsful a day.

37. COMPOUND SYRUP OF CHICORY.

Rhubarb enters into the composition of this syrup. As a mild purgative. It is given in the dose of a dessert spoonful two or three times a day.

38. PURGATIVE DRAUGHT.

Compound syrup of chicory, ℥ j; prune water, ℥ j. Mix, to be taken by spoonful at a time, several times in the twenty-four hours.

39. PURGATIVE MIXTURE.

Calomel, ¾ to 3 grains; simple syrup, ℥ vj. Mix, to be taken as one dose.

40. EMETIC DRAUGHT.

Tarter emetic, 1 grain; syrup of ipecacuanha, ℥ j; oxymel of squills, ℥ iij; infusion of polygala, ℥ iv. To be given, a spoonful at a time, as an emetic, in croup.

41. ANOTHER.

Tartar emetic, 1 grain; simple syrup, ℥ j; distilled water, ℥ ij. Mix, a teaspoonful to be taken every quarter of an hour until vomiting is produced; the medicine to be suspended after the third or fourth attack of vomiting.

42. ANOTHER.

Syrup of ipecacuanha, ℥ vj to ℥ iss; or ipecacuanha powder, 4½ to 6 grains; syrup, ℥ j. Mix, to be taken in a dose.

* Composition of the laudanum of Sydenham: picked opium, 26 grammes; saffron, 32 grammes; canella, 4 grammes; cloves, 4 grammes; malaga wine, 500 grammes; 20 drops weigh about 15 grains, and represent ¾ of a grain of the gummy extract of opium.

43. ANOTHER.

Tartar emetic, 1 grain ℥ iiss; oxymel of squills, ℥ vj; simple syrup, ℥ vj; ipecacuanha powder, 75 grains. Mix and shake. A spoonful every quarter of an hour until vomiting is produced.

44. NARCOTIC DRAUGHT.

Extract of belladonna, ½ grain; distilled water, ℥ ij; simple syrup, ℥ j. A teaspoonful every hour. Six teaspoonsful a day for a child one year old. In hooping cough.

45. NARCOTIC DRAUGHT.

Powdered belladonna root, 3 grains; ipecacuanha powder, 6 grains; sugar, ℥ ij. For 16 powders. One or two a day for a child three years old. In hooping cough.

46. ANOTHER.

Powdered belladonna root, 4 grains; Dover's powder, 9 grains; sugar, ℥ iv; washed sulphur, 30 grains. For 20 powders. One powder every 3 hours for a child two years old. In hooping cough (Kahleiss).

47. NARCOTIC SYRUP.

Syrup of opium, ℥ j; syrup of bark, ℥ j; syrup of ipecacuanha, ℥ j. Mix; a teaspoonful to be taken morning and evening. In hooping cough for children four years old.

48. ALTERATIVE DRAUGHT.

Iodide of potassium, 4½ to 7½ grains; distilled water, ℥ j; simple syrup, ℥ v. Dissolve; to be taken, a teaspoonful at a time, in the twenty-four hours. In the syphilitic coryza of infants.

49. ANTISPASMODIC POWDER, OR THE POWDER OF CARIGNAN.

Prepared amber, ℥ iiss; mistletoe, ℥ j; fraxinella root, ℥ j; prepared hartshorn, ℥ j; peony root, ℥ ss; carbonate of ammonia, ℥ v. Mix. In the convulsions of children. 15 grains for a child of one year, 30 grains for a child two years of age, &c.

50. ANTISPASMODIC POWDER.

Flowers of zinc, 6 grains; musk, 3 grains; laudanum of Sydenham, 6 drops; sugar, ℥ ij. Make a powder and divide into eight portions. A powder every two hours. In convulsions, trismus, and tetanus.

51. ANTISPASMODIC DRAUGHT.

Lettuce water, ℥ iss; simple syrup, ℥ vj; tincture of musk, 2 to 6 drops. In nervous affections and in spasmodic diarrhœa.

52. ANTISPASMODIC POWDER.

Calcined magnesia, crabs' eyes, scraped hartshorn, valerian root—of each 15 grains. Mix, and make into a powder, of which about 10 grains should be taken twice a day.

53. ANTIPERIODIC PILLS.

Dry extract of bark, 6 grains; powdered sugar, 6 grains. Mix and divide, so as to make two powders, to be taken with an interval of some minutes after the attack of fever.

In children one year old, in intermittent fever with hypertrophy of the spleen.

54. ANOTHER.

Impure quinine, 3 grains. To be reduced to powder and given in gooseberry jelly. For children of one year old, in intermittent fever. This medicine, which it is very difficult to procure, possesses the advantage of being nearly tasteless, and may be easily swallowed by young children. It is almost impossible to administer the sulphate of quinine at this period of life.

55. DIURETIC DRAUGHT.

Lettuce water, ℥ iss; oxymel of squills, ʒ vj; tincture of digitalis, 10 to 15 drops. In cases of serous infiltration.

56. SUDORIFIC DRINK.

Sassafras chips, ℥ ij; liquorice root, ℥ ss. Bruise thoroughly, and take a spoonful every day to make an infusion, as in the case of tea. In the exanthemata.

57. DRAUGHT FOR RICKETS.

Cod liver oil, ʒ vj to ℥ j; simple syrup, ℥ j. Mix; to be taken in the morning by children one year old.

58. ANOTHER.

Fish oil, ʒ vj to ℥ j; syrup, ℥ j. Mix. Like the preceding.

59. ANOTHER.

Fish oil, ʒ vj; syrup of bark, ℥ iss. Mix. Like the preceding.

60. CAUSTIC INJECTION.

Nitrate of silver, ℈ vijss to ʒ v; distilled water, ℥ j. Dissolve as a topical application in croup.

61. ANOTHER.

Nitrate of silver, ¾ grain to 1½ grain; distilled water, ℥ j. Dissolve. In chronic and pseudo-membranous coryza.

62. OPIATED ASTRINGENT COLLYRIUM.

Sulphate of copper, 3 grains; distilled water, ℥ iss; laudanum of Sydenham, 5 drops. Mix. In cases of conjunctivitis.

63. ANOTHER.

Sulphate of zinc, 3 grains; distilled water, ℥ iss; laudanum of Sydenham, 5 drops. Mix. In cases of conjunctivitis.

64. ASTRINGENT COLLYRIUM.

Sulphate of zinc, 3 grains; infusion of elder, ℥ iij. Dissolve.

65. ANOTHER.

Liquor of Van Swieten, ℥ j. Used as a collyrium, this is an excellent remedy in the ciliary blepharitis of children.

66. ASTRINGENT COLLYRIUM.

Nitrate of silver, 7 grains; distilled water, ℥ j. Dissolve. To be applied with a brush between the eyelids, two or three times a day. In the purulent ophthalmia of infants.

67. ANOTHER.

Nitrate of silver, 1½ grain; distilled water, ℥ j. Dissolve. To be dropped into the diseased eye two or three times a day. In corneitis with ulcers of the cornea, in granular blepharitis with conjunctivitis, &c.

68. OPHTHALMIA OINTMENT.

Lard, ℥ j; red precipitate, ℈ ij. Mix. To be rubbed on the edges of the lids morning and evening. In ciliary blepharitis.

69. ANOTHER OF DESAULT.

Red oxide of mercury, ℈ iij; prepared oxide of zinc, ℈ iij; calcined alum, ℈ iij; semi-vitreous oxide of lead, ℈ iij; bichloride of mercury, 9 grains; lard, 78 oz. Mix, and rub down in a mortar. To be used like the preceding.

70. OINTMENT FOR TINEA (FAVUS).

Powdered sulphuret of potassium, ℥ iij; subcarbonate of soda, ℥ iij; lard, 24 oz. Mix. To be rubbed in once a day.

71. ANOTHER OF THE BROTHERS MAHON.

Lard, ℥ ij; soda of commerce, ℥ ss; lime, ℥ ij. Mix carefully.

72. POWDER OF THE BROTHERS MAHON.

Fresh wood ashes, ℥ ij; powdered charcoal, ℥ j. Mix. The previously shaved head of the child to be powdered over every day.

These two formulæ are very inexact, for the composition of the remedies employed by MM. Mahon is not known. What we know of them has been discovered by means of chemical analysis.

73. TAR OINTMENT.

Tar, ℥ j; lard, ℥ viij. Mix; to be rubbed on the epigastrium. In prurigo and in squamous diseases.

74. VESICATION BY CROTON OIL.

Croton oil, ℥ j; lard, ℥ ss. Mix. Frictions morning and evening until the characteristic eruption appears. It is thus used in pleurisy, pneumonia, &c.

75. TARTAR EMETIC OINTMENT.

Lard, 12 parts; tartar emetic, 2 to 4 parts. Mix. To be rubbed on the epigastrium. In obstinate cases of hooping cough.

76. EMOLLIENT ENEMA.

Decoction of marshmallow, ℥ iij. Bran water and linseed water may also be made use of.

77. STARCH ENEMA.

Warm water, ℥ iij; starch, ℥ ij. Mix.

78. OPIATED ENEMA.

Decoction of marshmallow, ℥ iij; laudanum, 2 drops.

79. ANTISPASMODIC ENEMA.

Distilled water, ℥ iij; extract of valerian, 15 grains.

80. ANOTHER.

Assafætida, from 7 to 15 grains; yolk of one egg; marshmallow, ℥ iij.

81. OILY ENEMA.

Decoction of marshmallow, ℥ iij; olive oil, ℥ ij. Mix.

82. PURGATIVE ENEMA.

Decoction of linseed, ℥ iij; miel de mercuriale, ℥ iv to ℥ v. Mix.

83. ANOTHER.

Senna leaves, ℥ j to ℥ iiss; water, ℥ iij. Infuse for an hour and add sulphate of soda, ℥ j to ℥ ij.

84. ASTRINGENT ENEMA.

Nitrate of silver, gr. j; distilled water, ℥ iij. Dissolve.

85. ANOTHER.

Extract of rhatany, 15 grains; distilled water, ℥ iij. Dissolve.

86. ANOTHER.

Tannin, 12 to 15 grains; distilled water, ℥ iij.

87. ANTHELMINTIC ENEMA.

Absinth leaves, ℥ ij to ℥ iv; distilled water, ℥ iij. Make an infusion against ascarides. Refer to other formulæ.

88. ANOTHER.

Corsican moss, ℥ iv. Boil for six minutes in ℥ iv of water; strain, and add castor oil, ℥ j.

89. ANTHELMINTIC TREATMENT.

Tænia. Etherial extract of male fern, 15 to 30 grains, in preserve. One hour after, ℥ vj to ℥ j of the syrup of sulphuric ether.

One hour afterwards, ℥ ss to ℥ vj of castor oil.

One or two pills, doses of ¾ of a grain of calomel in the course of the day.

90. ANOTHER.

Scammony, 6 grains; gamboge, 2 grains; calomel, 2 grains; root of male fern, ℥ ss. Mix and divide into three doses, which should be given in jam, with an interval of three hours between each dose.

91. VERMIFUGE DRAUGHT.

Corsican moss, ℥ j; throw into boiling milk ℥ iv; strain, an dadd sugar, ℥ j. To be taken in one dose in the morning, fasting.

92. LOZENGES OF SEMEN-CONTRA.

Powdered sulphate of iron, ℥ j; semen-contra, ℥ iij; sugar, ℥ ij. Mix and add enough mucilage of gum tragacanth to make 64 lozenges. From 4 to 6 lozenges a day.

93. ANTHELMINTIC ELECTUARY.

Semen-contra, ℥ ij; jalap root, ℥ j; canella, ℥ ss; calomel, 6 grains; syrup of peach flowers, q. s. To make an electuary, of which ℥ ss should given once a day for a child six years old (Vogler).

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