CHAPTER II.

GENERAL RULES FOR THE EXAMINATION OF CHILDREN.

Very small children, only a few weeks old, are very indifferent to a professional examination; they sleep much, and feel so comfortable when relieved of the firm bandages* for a little while, that they are rarely restless and unquiet. But when they once begin to recognize and distinguish surrounding objects, as is often the case with children three months old, every strange face frightens them, therefore also that of the physician who is called in to attend them. In some children this timidity lasts only till the eighteenth or twenty-fourth month; sometimes it decreases, sometimes again it increases, in others it persists till the fourth or sixth year. Much depends, however, upon the circumstances under which the child grows up; it will be the more timid, the fewer persons it has an opportunity to see; children that grow up in the city are, therefore, less timid than those reared in the country.

There are three circumstances which act as obstacles to the child's physician: the absence of speech, the marked agitation which the examination always induces, and, lastly, the crying which often accompanies this agitation. The first obstacle, of course, cannot be removed; it may, however, in a measure be replaced by a well-directed, comprehensive interrogation of those in charge of the child; the last two, on the contrary, must be avoided.

When a child has been washed, and nursed, or fed, it generally falls asleep; and, as these necessities in respectable families are attended to at about the same time every day, it is therefore very easy to observe and examine the child while asleep, and for this purpose it should be dressed in such light garments as will not necessitate its disturbance in removing them. Its sleeping is favorable for that examination which can only be fully appreciated when carried out with the utmost quietness—that part of the examination which can be made regardless of the agitation and crying may be deferred till the child is awake. From this it follows that the examination of sick children must be undertaken at two separate periods of time, namely, during its rest and during its agitation. The expression of the countenance, the attitude and involuntary motions of the body and extremities, the pulse, the kind and number of the respirations, and the results of auscultation, can only be properly noted *during rest.* The skin, its color, temperature, and morbid alterations; the mouth, the abdomen, genitals, anus, the extremities, the manner of nursing, and, above all, the cry, may be examined during the agitation.

* In Germany, and most of the countries of Europe, the entire body of the infant is bandaged with a long, broad cloth.—Tr.

The expression of the countenance betrays the sensations of even the youngest infants tolerably distinctly, and may greatly aid the experienced observer in the recognition of diseases and the formation of a prognosis. *Eusèbe de Salle* very correctly observes that the healthy nursling has a totally expressionless physiognomy, in which every one, a mother perhaps excepted, must agree with him. The fact is all the more important, that sick children have a certain expression of countenance, in great part due to the disappearance of the adipose tissue from the subcutaneous tissues; in part, however, this is due to a peculiar contraction of the otherwise relaxed facial muscles.

The expression of the countenance of a previously healthy, robust child becomes so rapidly changed in every profuse diarrhœa, and especially in Asiatic cholera, that it is often barely possible to recognize it again in twenty-four hours. The eyeballs sink back into the orbita, so that the lids are scarcely able to cover the bulbs, and a fold (corresponding to the lower border of the orbit) forms in the lower eyelid; the nose becomes pointed, and the previously plump, ruddy lips become sharp and thin.

In chronic atrophy, also, the last traces of adipose tissue disappear from the face; the integument everywhere becomes loose and corrugated, and, in addition, various contractions of the muscles take place, as a result of cerebral irritation, especially that of the frontal, next of the corrugator supercilii, and the levator alæ nasi et labii superioris muscles, by which the face acquires a senile appearance, and, on account of which, the French Pædiatricars, in a very ungallant manner, call it a Voltairian face.

Jadelot has described three expressions of the countenance, which he claims indicate the existence of internal diseases. The first expression begins at the internal angle of the eye, and becomes lost upon the zygomatic process. He calls it "le trait oculo-zygomatique." The second starts from the upper part of the wing of the nose and surrounds in a semicircle the external border of the orbicularis oris. This divides into two parts, into the nasal-expression (le trait nasal), and into that of the cheek (le trait génal). The third expression begins at the angle of the mouth, and becomes lost toward the chin. The first, it is claimed, denotes affections of the brain; the second, affections of the

abdominal; and the third, those of the thoracic organs. It is scarcely necessary for us to suggest to the reflecting physician that this is mere fantasy. Alas! it will not be made so easy for the physician to recognize and diagnose a disease by merely inspecting the face. But there is one single sign characteristic of a certain disease found in the face, namely, the rising of the alæ nasi with every inspiration, by which we are able to diagnosticate, with the greatest certainty, an inflammatory affection of the lungs.

As regards the attitude and movements of the child, the new-born is always apt to assume that bodily position which it occupied within the uterus. The back is bent a little outwardly, the head flexed upon the chest, and the limbs are bent upon the body. When a child lies quietly, sleeps soundly and uninterruptedly, and is tolerably active when awake, then it may be satisfactorily concluded that it is in excellent health. There is a decided contrast between this state and the condition of powerlessness and stupor. In the former the mobility of the child is abolished, it lies then apathetic; in the latter, on the contrary, the eyes are staring, and follow no more the eyes of the mother, or of the nurse; as is the case even with very small, healthy nurslings, of but four weeks old, the eyelids cover only half of the cornea, and do not become completely closed even during sleep.

If children throw themselves about unceasingly, and find no rest in any position; when they have a heightened tempreature of the skin, with an accelerated pulse, and then become tranquil without any diminution of the fever having taken place, this remission is only the result of increasing weakness, and may be regarded as an unfavorable sign. In exudative affections of the brain, children often flex the head backward; in cerebral atrophy, as a result of general atrophy, they will constantly rub the occiput on the pillow, or bore the head into it, and with their little hands pull their hairs and ears. Healthy children, when tired, fall asleep in any posture and quietly continue to do so; but in pneumonia, in most instances, they choose the dorsal decubitus, or lie on the affected side, and will immediately turn over if they happen to be placed upon the unaffected side. Children with scrofulous inflammations of the eyelids, and sometimes those with cephalic pains, lie upon the face.

When infants during nursing, or shortly after that, are laid upon the left side, they generally become restless and begin to vomit; this is apparently owing to the enormous size and weight of the liver, which in this position presses upon the stomach. For that reason also do nurslings suck with more ease at the left breast, for, being oftener put to this one, more milk is usually found in it than in the right. This

argument is quite probable, from the fact that nurslings who obstinately refuse to suck at the right breast will very often take it without any objection as soon as their lower extremities have been put under the mother's right arm and they are allowed to *nurse while lying upon the right side.*

Children frequently point directly to the site of the pain with the hands. During dentition they feel about in the mouth, in hydrocephalus and cerebral irritation they will pull at the hairs (but sometimes also at the genitals), and in croup they press and rub themselves about the neck; older children, when suffering from colic, press with their hands upon the abdomen, or when suffering from pain in the bladder, which is often caused by vesicants, upon the organ. When affected with worms, they will pick and bore at the nose and anus. Atrophic children keep their thumbs drawn inward and the hands shut firmly. The flexing and extending of the lower extremities by starts and jerks, attended by crying, are the ordinary signs of flatulence, and cease as soon as the flatus has been discharged.

The examination of the pulse can only be carried out with success in a *sleeping* child. In one that has waked up suddenly, or has become agitated through much handling, the physician will find that he has to battle with insurmountable difficulties. The child seeks in every manner to twist itself loose from his grasp, and the firmer the arm is fixed, the tenser does the child make its muscles, and it often becomes wholly impossible to feel the pulse.

Various measures have been suggested by which we might be enabled to feel the pulse in a child, such as to allow it to suck at the breast or bottle. But the act of sucking always accelerates the respiratory and the cardiac actions, and for this reason no useful information whatever can be obtained by this method. It is best, therefore, to quietly approach the child while asleep, lightly compress the radial artery with the end of the index-finger, and, when it moves its arm, accompany it in all its movements without the least resistance; after the removal of the fingers the child usually sinks again into a sound and lasting sleep. But if the restlessness of the arm continues, the examining finger should be withdrawn, because otherwise the child will surely be awakened, and no time is so unfavorable for examination by the physician as that after awaking from sleep. The neglect of these precautionary measures will doubtless serve to explain the reason why most authors state the pulse of the nursling infant to be so high, 130 to 140 beats per minute. Valleix, physician to the Foundling House at Paris, has found the medium of the pulse in thirteen healthy sleeping nurslings, from three to twenty-one days old, to be 87 (minimum 76, maximum 104).

In twenty-four healthy sleeping nurslings, I found the minimum 92, maximum, 136, medium, 109 per minute. It is still more difficult, on account of the smallness of the artery, to discriminate between a hard and a soft pulse. Undoubtedly, our chief attention in nurslings should be directed to the rhythm of the pulse; an unrhythmical, interrupted pulse occurs in cardiac affections and cerebral diseases. Great frequency of the pulse-beats in children has much less significance than in adults, for that condition is induced by the least excitement and the most trivial pain. Slowness of the pulse is observed in sclerema of the new-born, and in cerebral compression. In many instances before death the pulse is altogether imperceptible for one or several days.

The examination of the *respiratory organs* in small children is attended by the greatest difficulties, occasioned as much by the smallness of the affected organs as by the restlessness and refractoriness of the child. The physical examination embraces inspection, percussion, auscultation, and palpation, the first two of which can only be performed during perfect quiet, but the last two even in crying children.

Inspection.—First of all, as regards the number and kind of respirations in children who have not yet passed the first year of life, it appears, from the very positive statements of the most conscientious authors, that upon this point no definite normal numbers can be given. These statements fluctuate between eighteen and thirty-five respirations per minute. Above all, we must remember that the respirations, even of healthy children, are not alike during sleep and wakefulness. Only during sleep is respiration performed in a perfectly regular and rhythmical manner. Sixty experiments, which I instituted in twenty-two sleeping children from three to four weeks old, gave me, as a medium, 26.4 inspirations per minute. As soon as the children are roused and have become somewhat lively, the respirations are changed by every touch, every unusual noise, and every change in the light of the room; the interval is longer than usual, and is followed by a few short, very quick or deep and slow breathings; and, if the children now begin to cry at all, the rhythm will be entirely abolished; in general, however, the respirations increase in frequency during crying. Owing to this great physiological variation, no diagnostic conclusion can readily be arrived at from any small deviations from the medium number.

In children who have passed the first year of life, the respiratory acts are more uniform in the wakeful state. In pulmonary affections, which occur extremely often in childhood, particularly lobular pneumonia and rachitic carnification, the breathing is accelerated

from two to four fold, consequently to fifty or eighty in the minute, without any mechanical hinderance, solidification of large portions of the lungs with exudations being physically demonstrable. In later years, after the completion of the second dentition, certain diseases only abolish the rhythm, especially all those cerebral affections which are capable of exercising a serious pressure upon the cerebral substance, above all, acute hydrocephalus; furthermore, large cerebral tubercles, carcinoma of the brain, and sometimes also meningitis and cerebral hæmorrhage, if the amount of pus or blood upon the meninges has attained to a certain quantity. In these cases, the respiratory acts are remarkably irregular, alternately retarded and accelerated, deep or sighing.

As regards the respiratory actions, we have in the healthy child abdominal respiration predominant, i. e., the diaphragm contracting stronger and firmer than the muscles of the thorax; the upper part of the chest is almost entirely undistended; the lower portion, however, is all the more markedly expanded, so that more of a change of form of the abdomen takes place than of the thorax. The manner of breathing varies greatly in various pectoral diseases; the various deviations will more appropriately be spoken of in connection with the individual diseases. A careful inspection of the thorax is very important, and often supplies many clews, even before the actual physical examination has been commenced, which, on the whole, in the restless condition of the child, is often unsatisfactorily accomplishable.

Percussion of the infantile thorax is best executed without a pleximeter or hammer, finger upon finger. The excellent rule in surgery, to avoid using all instruments that can be replaced by the hand, is here all the more applicable, as children, especially those between two and three years of age, have an insurmountable dread of the hammer and pleximeter, whereas by gentle and tender management they will readily allow themselves to be percussed with the fingers. Children carried about upright are best percussed in the arms of the mother. In these, the dorsal surface, upon which the greatest attention is to be bestowed, offers itself most conveniently, and the youngest children most readily submit themselves to be percussed when they are in direct contact with their mother. Young infants should be percussed in the lateral decubitus, from which little opposition will seldom be encountered. That the hands should be warmed before they are laid upon the naked body of the child, is self evident. Physicians who suffer from cold and moist hands will not particularly succeed in the children's practice.

The percussion-stroke should be made absolutely softly, gently,

and slowly, and should be continued long enough on one spot until there has been a chance to percuss in the moment of the deepest inspiration and most complete expiration; for this purpose, ten and even more blows will often be requisite.

A *forcible* percussion, such as is requisite on the back of an athletic adult, is, on account of the elasticity of the thorax and the smallness of the organs to be examined, never allowable in children. The percussion is not made plainer thereby, but other parts, generally the intestines, are made to resound; and, besides, the child is instantly and surely frightened by strong blows.

Percussion should be performed *slowly*, because the examiner always requires a certain amount of time to appreciate the sound produced, and to form an opinion of it. The most experienced ear is unable to detect the finer variations of the sound produced by the usual rapid thumpings.

The same place is to be percussed until the deepest inspiratory and expiratory moment is caught, because only by comparing and properly estimating the two percussion-sounds thus obtained, and which *always differ* from each other, is a thorough investigation of the percussed part possible.

I must call special attention to a phenomenon which, in spite of its daily occurrence, has nowhere yet been properly estimated, and still less satisfactorily explained, namely: when both lungs of a healthy child are percussed by way of comparison on the back, from birth up to the second and even the third year, there is found on both sides, so long as the child breathes calmly, and makes no noise whatever, a sonorous, feeble, or strong tympanitic percussion-sound; as soon, however, as it becomes disturbed or restless, or when it resists the examination, and proclaims its unwillingness by a pressing outcry, then *the whole condition is suddenly changed.* Instead of the equal sonorous tympanitic sounds of both sides, a moderately dull percussion-sound prevails over the left lung, and a flat, empty sound over the right lung as far upward as the spinæ scapulæ. But, if the percussion is now quietly continued on the same spot some seconds, or even for minutes, till it happens that a percussion-stroke coincides with the moment in which the child again inspires deeply, and, for that purpose, has to abandon the abdominal pressure till the completion of the respiratory act, the original normal percussion-sound is suddenly heard again; it, however, lasts but a few moments, and is instantly succeeded by an empty, flat sound.

If the percussion has once disturbed the child, and especially if it does not cease to cry with the violent abdominal pressure, and, so long as this pressure lasts, the phenomenon just described may

be studied with the utmost advantage in any child under one year of age.

The proximate reason for this diminished sonorous sound upon the entire dorsal surface is owing to the abdominal pressure, whereby the whole contents of the abdomen are compressed upward. The difference between the right and left sounds, namely, the completely empty, flat percussion-sound on the right, is explainable by the strong upward pressure of the liver, the size of which is still disproportionately greater in comparison with the rest of the abdominal organs.

Upon the anterior surface of the thorax, and also on both sides, the changes in the percussion-sounds, originating from the action of the abdominal pressure, are also noticeable, but in a much less striking degree.

The singular phenomenon just described, namely, the complete dulness posteriorly toward the right side, causes my confidence to be somewhat shaken in the histories of pneumonia in small children that we find so frequently in text-books and journals; and the more so, as the dulness in those cases is always described to have been most intense posteriorly on the right side. Such physical investigations only can be relied upon in which it is expressly stated that, during the investigation, the child respired perfectly calmly and quietly; that it did not employ the abdominal pressure, and that the dulness detected then was also present during the inspiration, and could be distinctly discerned for several days. I am convinced that attacks of bronchitis, which in the first days of their existence are attended by some fever and dyspnœa, are regarded as cases of pneumonia in consequence of the observer's not being aware that the dulness which, under the circumstances described above, appeared on the right side posteriorly, *is a normal physiological condition;* this may also explain the successful treatment of and rapid recoveries from pneumonia.

There is another phenomenon to be noticed in percussing the thorax of a crying child, namely, the so-called metallic tinkling. This sound a person may study upon himself at any time, by striking the sternum with the shut fist, and at the same time singing loud notes. The tone is thus momentarily interrupted by a sound that has a metallic clang, and a pitch the same as the tone sung, which, directly after the blows have occurred, rings out in its original purity. This sound cannot be confounded with cavernous metallic tinkling, and the *bruit de pôt fêlé* occurring in the adult, as it can only be produced during crying or speaking, whereas that arising from cavities is heard even when the patient does not utter the least sound. Metallic tinkling is