have induced me to discard it altogether where a special and experienced nurse does not undertake the care of the child. Internally, I generally give kali carb. (℈ss—℈j to water ℥iv), and allow the patients to drink as much as possible, because experience has proven that, by promoting diuresis and diaphoresis, a mitigation of the catarrhal secretion of the respiratory mucous membrane is produced. It will seldom be necessary to resort to emetics.

(3.) Neurosis of the Larynx. — Motor disturbances of the laryngeal muscles frequently and almost exclusively occur in childhood. Both forms, the spasm and paralysis, are observed, but the former is much more frequent than the latter. It must be premised that, as a rule, all those laryngeal affections must be excluded in which any symptom of material lesions of the mucous membrane can be detected; for, since the muscles of the larynx must by such lesion become altered, a change of the voice follows, as well as a change in the manner of breathing, and in the cough. These exclusions having been disposed of, the neuroses remain. In slighter deviations from the normal construction, which, in the cadaver, presents a pathologically altered mucous membrane, it is often difficult to decide whether death resulted from a pure neurosis, or from a swelling of the mucous membrane, or an œdema of the glottis.

(a.) *Spasmus Glottidis.*—That the glottis may become spasmodically contracted is no longer any subject of doubt. This may be demonstrated experimentally by vivisections, and is anatomically confirmed by the insertions of the muscles of the larynx. These muscles are supplied by the recurrent laryngeal nerve, and are (1), the thyro-arytænoidei; (2), the cricoarytænoidei laterales; and (3), the arytænoideus transversus.

An acute and a chronic form may be distinguished. There are spasms of the glottis in which death ensues, after the first few paroxysms, by choking or suffocation, and others again which last for months, and may relapse after very long pauses. The writers of the preceding and of the present century record no precise reports concerning this condition, but differ remarkably from each other in their views upon it, and consequently have invented a number of names, most of which are based upon etiological views, causing the greatest confusion in the minds of those physicians who do not rely upon their own investigations. Thus there was an asthma acutum et chronicum Millari, the symptoms of which, however, are more applicable to our own pseudo-croup than to a pure spasmus glottidis—an asthma thymico-cyanoticum—a suffocatio stridula—an angina stridula—apnœa infantum—catalepsis pulmonum (Hufeland)—a laryngismus stridulus—phreno-glottismus—laryngo-spasmus infantilis—tetanus apnoicus infantum—and finally even a cerebral croup, by which the English, especially *Clark*, understood a species of croup, at the autopsy of which the larynx was found unaffected, and which, of course, was always ascribed to a cerebral disease that was not demonstrable.

Symptoms.—The following morbid picture may be delineated in general outlines. Usually very healthy, robust children are seized during the process of dentition with a suffocative attack. All at once the face becomes strongly injected, the head is thrown backward, the mouth is slightly open, or makes snapping movements; the extremities are stiff, or hang down powerless; the child also plucks at its neck, as if it would tear away the cause of its strangulation. Finally, after a most tormenting struggle of a half to one minute, a few short, abrupt whistling inspirations follow, with which no expirations alternate, and then the whole fit is either at an end, and the normal respiration inducted again by a prolonged whistling expiration, or another suffocative attack, with totally arrested respiration, begins. This entire phenomenon may recur several times in succession, so that the child does not return to normal or much improved respiration for several minutes. The paroxysms occur as often in the daytime as in the night, and may return forty times in the twenty-four hours; they are especially induced by deep inspirations. If the disease has existed for a certain time, general convulsions will become superadded to the spasm of the glottis—a condition which has been described by some authors as the second stadium.

If we are to analyze the individual symptoms more accurately, it will be necessary to classify them first into two groups: (1), as to the symptoms during the attack, and (2), the symptoms in the intervals.

(ad 1.) The tone which accompanies the first inspiration after the suffocating fit, and at the beginning of the cataleptiform state, popularly called "Ausbleiben" in German, is always very characteristic. It is a crowing, whistling cry (the crowing inspiration of the English), and is tolerably accurately imitated by executing a sipping inspiration through the almost-closed chink of the glottis, while at the same time attempting to utter the vowel *i*. Sometimes this cataleptic state is also ushered in by a few of these inspirations, but, in most instances, the children have not the time for that, and, as if strangled, gasp voicelessly for air, along with which they become livid, and throw the head backward, in order to dilate the chink of the glottis as much as possible. Immediately after the attack, the expirations are superficial and apprehensive, but soon become perfectly normal, and free from the whistling noise heard in croupy breathing.

The superaddition of general convulsions to *spasmus glottidis*

(second stadium), as relates to prognosis, is very important. The thumbs are now drawn in toward the palms, the forearms strongly pronated, and all the adductors of the upper extremities affected with spasmodic contractions. The feet, on the contrary, are rigidly extended, the great toes abducted and drawn upward. The muscles of the face are thrown into convulsive action, and opisthotonos may appear. The temperature of the extremities is much more likely to be diminished than increased. These general convulsions plainly depend upon those of the glottis, for they appear and disappear with them.

During the paroxysm, the face, of course, becomes flushed and even cyanotic. The congested eyeballs protrude from their cavities, the tongue becomes bluish-red, and the veins of the neck distended, and the face is stamped with the expression of the utmost anxiety. During the attack itself it is very difficult to feel the pulse, or to distinguish by auscultation the sounds of the heart. Indeed, such an examination, at a moment of so great danger to life, is not only useless, but improper and cruel, and should not be practised at such expense of most precious time. Several minutes after the paroxysm the pulse is still distinctly felt to be unrhythmical and irregular. The fæces, and less frequently the urine, are passed involuntarily during the paroxysm.

(ad 2.) The symptoms during the intervals are different, according to the severity and the duration of the paroxysms. Most children, during the interval, are tired and petulant, but in the mild cases appetite and sleep are enjoyed. In those instances where the spasms are intense and frequently repeated, the child loses its appetite, becomes emaciated, and suffers more or less fever.

Duration, Course, and Prognosis.—The duration of this disease cannot be fixed at any given time. Sometimes even the very first attack terminates in death, and a seemingly perfectly healthy child may be carried off in a few seconds. Others may suffer for months, periodically, as often as a tooth breaks through, from a crowing, whistling inspiration, not, however, from total closure of the glottis, and its extreme symptoms, as the normal respirations recur after a few seconds. In most cases, the disease runs through a certain circuit, in which an aggravation, a climax, and a diminution, can be recognized. At first the attacks are rare, recurring every eight or fourteen days, but in the process of time they become more frequent, finally occur several times daily, and increase in intensity. Before this climax has been reached, six to eight weeks generally pass away. The children either perish in a fit, or, when this acme has lasted for from eight to fourteen days, are attacked by fever and become emaciated. A lobular pneumonia or a profuse intestinal catarrh may come on, and result

in death. Recovery, unfortunately, happens very seldom when the disease has once passed beyond a certain grade of severity. In the favorable case, the paroxysms remit in frequency and finally cease altogether. But the child remains very backward in its development, is always pale, rachitic, and predisposed to relapses, which, however, seldom terminate unfavorably. Out of fifteen cases of which I have kept a record, eight died. *Rilliet* and *Barthez*, out of nine cases, and *Herard* out of seven, observed in each only one single instance of recovery. It may be safely assumed that this relative mortality had turned out rather too unfavorable, since only the serious cases under the care and watchful eye of the physician are taken into account; and the milder forms, which gave the physician but little trouble, and caused the parents no great anxiety, are probably not mentioned.

The prognosis depends upon the frequency and intensity of the attacks, upon the complication, and upon the comparative development of the child. Children at the breast recover oftenest; thin, emaciated children, and those inclined to atrophy, very rarely. The more developed and extensive the craniotabes is, the more unfavorable is the prognosis; the connection between it and spasm of the glottis will be more thoroughly discussed in the following section.

Etiology.—We have to discriminate between the causes which give rise to, or favor the single paroxysms, and the general exciting causes which are particularly predisposing to the disease.

To the first belongs fright. A loud, suddenly-produced noise suffices to induce a spasm of the glottis. It may also be produced by depressing the tongue in the examination of the mouth, by the acts of deglutition, by coughing, and by crying. But the closure of the glottis brought about by crying should be carefully distinguished from that cataleptic state into which very choleric and somewhat older children, from two to four years of age, are *voluntarily* able to work themselves. There are very many, chiefly badly-brought-up, spoiled children, who at the slightest provocation throw themselves into violent paroxysms of crying, and exert themselves so forcibly that they are for a moment unable to draw their breath, and for an instant become livid or even bluish-red in the face, and then begin their cry anew with a whistling, prolonged inspiration. This kind of voluntary unconsciousness is by no means dangerous, and there is no reason at all why the will of such children should be humored in order to avoid this condition. The most rapid psychological method of treating it is, to dash a glassful of cold water at once into the face.

When the disease reaches its climax, it will require no active cause to induce a paroxysm. Then the attacks come on during the

calmest sleep, under the quietest circumstances, and at any time, without the least exciting provocation.

By analyzing the *general causes*, very peculiar phenomena are elucidated. First of all, as regards the sex, spasmus glottidis attacks boys much oftener than girls; a fact almost all authors admit. Out of my fifteen cases, eleven were boys, so that it seems as if the larynx of male children begins even in the very earliest youth to distinguish itself in form, or at least in physiological activity, from that of female children.

The *age* at which the disease occurs fluctuates between one half and three years; that is to say, it makes its appearance with the eruption of the first tooth, and disappears with that of the last. It occurs much oftener with the cutting of the incisor teeth, in the first half year of life, than with that of the canine and molar teeth. The thought constantly suggests itself, whether a direct extension of the reddening and swelling of the mucous membrane, as a result of dentition, to the larynx, might not be assumed. In that event, however, spasm of the glottis would be most sure to occur where the local troubles of dentition are most perfectly pronounced. But this, according to my observation, is by no means the case. In most of these children I found the mouth not particularly reddened, and without profuse secretion.

The *hereditary character* of spasm of the glottis is interesting. There are families in which all the children suffer more or less from it, and *Powell* even relates an instance where, out of thirteen children, brought up by the same parents, only one escaped the disease. The mothers of the children whom I have treated for this disease were all of a tolerably excitable nature, and often complicated the child's disease by indulging in their habitual hysterical outbursts.

The connection between *craniotabes* and spasmus glottidis (tetanus apnoicus) has been satisfactorily demonstrated by *Elsässer*, the discoverer of the soft occiput. Not the softness and depressibility of the occiput *per se*, but their *effects*, should be regarded as the exciting causes, as the meninges may thereby degenerate into an abnormally-congested condition; true plastic exudations are not generally found in children who died from this disease. The discovery of the relation between these two diseases by *Elsässer* was subsequently fully confirmed by many authors, especially *Lederer*, and cases have even been recorded in which spasm of the glottis could be voluntarily induced by pressure on the softened places of the rachitic occiput. Without doubting altogether this mechanical cause, it can, nevertheless, only be regarded as an exceptional one; for, if it had a general applicability, then the paroxysms ought to come on oftenest during sleep, when

children lie with the occiput pressing the pillow, than in the waking state, when they are mostly carried about upright. But exactly the contrary is the case. The hyperæmes of the brain, and of its membranes, upon which *Elsässer* lays a particular amount of stress, are much more probably the effect than the cause of the disease, and when, *ex juvantibus et nocentibus*, a conclusion might be made upon the nature of a disease, then they stand in no causal connection at all with the spasms, because otherwise these should be cured or palliated by local abstraction of blood, and by a derivative action upon the bowels, a result well known to be impossible of achievement by these means. We must therefore limit ourselves to admitting the remarkably frequent concomitance of spasmus glottidis with craniotabes, as irrefutable facts, but require further physiological and anatomo-pathological investigations, for the conclusive proof as to cause and effect.

Disturbances of the digestion may likewise produce spasms of the glottis, as may be readily inferred from the fact that a sensible regulation of the diet, and abstaining from nutriments difficult to be digested, bring about a speedy improvement; while all treatment is fruitless so long as the digestion is attended by flatulence or diarrhœa, or other disorder. Children at the breast are extremely rarely affected by this disease; and, of the artificially-fed children, mainly those who do not properly digest the immoderate quantities of food allowed them suffer. That the children of affluent parents are totally spared by this affliction, as *Rilliet* has observed, in Genf, cannot be maintained by us in Munich. The children of poor people do, indeed, oftener fall sick with it, but it should not be forgotten that in all cities there are more of these than of rich.

Finally, *Kopp*, and, after him, a great number of physicians, assumed the *thymus gland* to be a cause, and, indeed, the only one, so that the description of "Asthma-thymicum Koppii" is even used at the present day by some of the older physicians. But pathological anatomy has overthrown this theory. A large thymus gland has often been found in the cadavers of children who have died from totally different diseases, and never suffered from spasm of the glottis; and, conversely, in many cases where this was the cause of death, a normal, and even an atrophied thymus was observed. Hence, it seems that we must discard asthma-thymicum altogether, as a denomination of a disease.

Pathological Anatomy.—So far as the larynx itself is concerned, the morbid appearance is invariably of a negative character, and thus the spasmodic nature of the disease is also confirmed by the *post-mortem* examination. The rest of the appearances are not constant, and consequently not characteristic. Rachitis is most frequently

found and most extensively marked upon the occiput, and next in frequency on the ribs. The thymus gland is sometimes large, sometimes small, and at times undergoing complete absorption. In the intestines, solitary glandular indurations are sometimes found; in the bronchi, catarrh, and, in the lungs, tuberculosis may also have appeared. The bronchial glands, in particular, are degenerated into large, cheesy tubercles. Hypertrophy and an injected state of the meninges are frequent morbid appearances. By some investigators the pneumogastric nerves have been found hardened, by others again soft.

Treatment.—(a.) *Prophylaxis.*—When one or several children of a family have already perished by spasm of the glottis, the parents are naturally in a state of constant fear that they may also lose those subsequently attacked, and therefore declare themselves ready for any sacrifice by which this calamity might possibly be averted. In this respect the country air is particularly recommended, but it must be remarked that it is only useful during the few summer months, when children may actually be taken out into the free air, and that the mothers, in such cases, are very averse to parting with their family physician; and, lastly, residence in the country by no means supplies a positive guarantee against the appearance of the spasms. I myself have twice been taken to the country to see children with spasm of the glottis, who were born there, and had never yet been in the city. Hence it seems more advantageous to leave the children in the house of the parents, and under the care of the regular family physician, where they can enjoy fresh air several hours daily in some neighboring park. Such children should be kept as long as possible at the mother's breast, at least till they have cut the first six incisors. The supervention of the occipital rachitis is sought to be averted by zealous ventilation of the room, by keeping the head cool, bathing it with water, and by aromatic baths. All sorts of digestive disturbances should be remedied as quickly as possible by small doses of alkaline carbonates, to which a little rhubarb may be added, when constipation is present.

(b.) *Treatment of the Attack.*—One minute is but a short time for the selection and application of a remedy, and it is altogether incomprehensible how some physicians would have us treat the *attack* with sinapisms, emetics, clysters of various kinds, and with warm baths, the preparation of which certainly requires a much longer time. The first thing to be done is to raise up the child, and throw the head backward, so as to give the larynx the most favorable attitude, and to remove all the tight clothes from the chest as quickly as possible. In the instances where I happened to be present at the

paroxysms, I introduced the index-finger into the mouth, carried it to the posterior pharyngeal wall, elevated the epiglottis, and then touched the chordæ vocales, by which marked acts of choking were instantly induced, and then the well-known whistling inspiration followed. Lay people, of course, are unable to execute these manœuvres, and I therefore content myself by showing them how retchings may invariably be induced by pressure upon the root of the tongue. The shock produced by inducing this act of retching is the only harmless remedy which will cut short the paroxysm. From affusions with cold water, and from the forcible to-and-fro swinging in the air, very much in vogue with the nurses, I have seen no decided effects; chloroform is very urgently recommended by many physicians, especially by *Cox* and *Smage*. It seems to me, however, to be too dangerous an agent to be left to the use of the lay attendant. Tracheotomy, which has been suggested as a *dernier ressort*, with which to save the life of the child, can never be performed, on account of want of time.

(c.) *Causal Treatment.*—Such a list of remedies, for the subjugation of the developed spasm of the glottis, has been recommended, that the very number alone must excite mistrust. Those still in greatest favor are: *oxide of zinc* in grs. ii—x pro die, *argent. nit.*, gr. $\frac{1}{8}$—$\frac{1}{2}$ pro die, *ammoniate of copper*, *asafœtida*, *tr. moschata*, *aq. amygdal. amar.*, *belladonna*, *hyoscyamus*, *opium*, *cannabis indica*, five drops every hour, and small doses of *calomel*. All of these remedies are uncertain, and have no specific effects whatever, for the majority of children perish notwithstanding the kind of treatment and remedies used. There is but one remedy by which the rachitis can be positively brought to a stand-still, and that is the raw, strongly-rancid cod-liver oil, and if the frequent concomitance of rachitis of the skull with spasm of the glottis is not lost sight of, then this agent has yet the greatest claim to a *rational* method of treatment. In fact, I have already seen three children recover by the use of *ol. jecoris*. It is to be regretted that it is very often not tolerated by the stomach, producing gastricismus and vomiting, on account of which, of course, it has to be discontinued.*

Scarification of the gums, which the English make various uses of, has found but little favor with us. In one child, in whom the two bicuspids were very nearly through, I performed it very energetically, but without the least effect. The paroxysms occurred oftener and oftener, constantly grew more and more violent, and the child succumbed, although the swollen gums had been completely removed, and the sharp edges of the teeth were plainly visible.

* Hillier and B. F. Dawson give bromide of potassium, and claim to have seen good effects from it.—Tr.

Combined with the internal administration of *ol. jecoris*, I have lately kept two children constantly in a mild camphor-atmosphere, by suspending from their necks bits of camphor loosely tied up in a rag. Both children recovered; whether this camphor-atmosphere contributed any thing thereto, more extensive trials may determine.

(b.) *Paralysis Glottidis.*—Paralysis of the glottis is a rare affection. This may appear remarkable, since tumors grow so frequently about the neck, and are liable to exercise pressure upon the vagus and recurrent laryngeal nerves, and thus produce paralysis of the laryngeal muscles. In vivisections after division of the recurrent laryngeal nerves, the glottis is seen neither to dilate during inspiration nor to contract during expiration; but in a very deep inspiration it mechanically becomes narrowed or closed, as the strong current of air gives to the chordæ vocales the form of two segments of a wheel, and their borders are thereby made to approximate, or even to touch each other, and thus be converted into valves. Paralysis of the glottis, resulting from disease of the central nervous system, is observed in most of the dying, and in very rare instances may also be caused by tumors, by large tubercles, or by carcinoma, existing at the base of the brain, a long time before death. Peripheral paralysis of the glottis originates through pressure upon the cervical portion of the pneumogastric, or upon the recurrent laryngeal nerve, which alone, according to the united investigations of *Volkmann*, *Longet*, etc., may give rise to dilatation, as well as to closure of the glottis. The pressure, as a rule, is caused by scrofulous enlargement of the lymphatic glands, lying in the course of the vagus, in which, at the autopsy, this and the recurrent nerves are found embedded and flattened. This fact furnishes a means of explaining the violent paroxysms of dyspnœa that sometimes occur in scrofulous children, in whom the external glandular swellings are often so insignificant that a dyspnœa, induced by their pressure directly, is altogether out of the question.

Symptoms.—The principal symptom is an uninterrupted, labored, rattling respiration, which, at every deep inspiration induced by crying, laughing, and strong exertions, terminates in a paroxysm of cough.

The respiratory sound is as loud as in croup, but is distinguished from croupy breathing by the less shrill and more rattling tone, and, in addition, by the ordinarily very slight dyspnœa, which, however, during the cough-paroxysms becomes more marked, and is often aggravated into an orthopnœa. This condition is always chronic, and, when no other afflictions are accidentally present, not attended by

fever. The voice here is rough, hoarse, and even complete aphonia may exist.

The duration of this affection cannot be foretold. On one occasion I saw it disappear spontaneously, although the glandular swelling visibly increased in size. It is presumed that a softening or absorption of the deeper portions of the gland took place, and thus relieved the pressure. Generally, the prognosis is unfavorable, a diffused bronchitis soon supervenes, and not unfrequently pulmonary tuberculosis, which in a short time carry off the patient.

Treatment.—As scrofula is almost always at the bottom of this affection, an antiscrofulous treatment will, therefore, be absolutely indicated. Cod-liver oil is decidedly the best remedy for it; locally, painting with iodine, repeated two or three times every week, most rapidly effects a diminution of the glands. If, in this manner, we do not succeed in removing or at least in mitigating the evil in from eight to fourteen days, it will be absolutely necessary to extirpate the affected glands. The effects which the hypertrophied glands produce show conclusively that they extend deeply down, and this operation should, therefore, only be undertaken by a skilful operator, well versed in the anatomy of the parts.

C.—*THYROID GLAND.*

If we exclude the extraordinarily rare thyroiditis inflammatoria, and traumatica, which may occur as the effects of external injuries, such as from throttling, contusion, etc., there will only remain for consideration the various kinds of hypertrophy of the thyroid gland.

Struma.—By struma we understand all kinds of enlargement of the thyroid gland. Sometimes the increase in size is only transient; generally, however, it is permanent, and constantly progresses. Either the whole gland hypertrophies, or only a single lobe or a small section of a lobe, and the symptoms of compression vary according to the direction in which the enlargement progresses. When the gland enlarges outwardly and anteriorly, the integument covering it will become gradually distended, and, with the exception of the unsightly disfigurement, no further disturbance of the functions of the adjacent organs will ensue. But if it becomes enlarged backwardly and laterally, the sterno-cleido-mastoidei muscle and the large vessels and nerves of the neck will be displaced, and manifold disturbances of the circulation and innervation supervene. With these, serious embarrassments of deglutition and of respiration become associated. When, for example, and fortunately very rarely, it happens that the strumous gland surrounds the œsophagus and trachea like a