ness in the traces of iodine and bromine, and still others in its oleic acids, and the admixture of decomposing particles of liver which are found in all cod-liver oils.

Since the experiments with pure fat, as well as those with minute doses of iodine or bromine, did not produce the desired effect, the last view seems therefore to be nearer the true one.

It is best to give the brown oil pure by itself in increasing doses, at first a teaspoonful, later a tablespoonful once or twice daily. Most of the children habituate themselves so well to it in a few days that they come to look upon it as a delicacy, and will drink several ounces of it at a draught, if they manage to get hold of the bottle. *Rachitis may be cured by the use of cod-liver oil alone*, even if the circumstances are in other respects *unfavorable*. To be sure, any possible improvement in the residence and nutrition will hasten the recovery. In this respect the following measures should be attended to:

Pure, fresh air is, above all things, necessary. In damp houses, which in winter are not ventilated for many weeks, children acquire rachitis very quickly, and in an intense form, and in these individuals cod-liver oil has only a slow and not a constant effect.

Zealous attention to the skin is to be mentioned as a second important adjuvant. The child should be bathed daily in an aromatic bath, and, in addition, the curved limbs should be washed every day with brandy.

Most of the young children, even with craniotabes, tolerate cod-liver oil very well; their restlessness is best palliated by douching the head with cold water, repeated every two or three hours. *Elsässer* recommends a pillow for the head, in which a pyriform hole is constructed, with the apex directed downward. It is a great comfort to the little patient. On account of the profuse perspirations, rachitic children should not be laid upon feather beds, but always on mattresses of horse-hair, straw, or sea-weeds.

Children who are still at the breast should be wet-nursed as long as possible, but, in addition to that, should be fed with broths. Cow's milk is the best nutriment for children up to the third year, and cannot be substituted by any other; it is to be given as plentifully as possible.

During the disease, an orthopedic treatment will hardly ever be of any benefit; not till after it has been cured can the proper machines and appliances be resorted to.

Great rachitic deformities, even in the adult, may sometimes be remedied by exsecting an accurately-calculated wedge of bone, and applying a proper apparatus.

(2.) Tuberculosis and Scrofulosis.—A great deal has been disputed concerning the distinction between tuberculosis and scrofula. Some consider these two conditions as perfectly identical; others, again, assert that there is no resemblance whatever between them.

It all depends upon the point of view from which the comparison is instituted. If regarded from the anatomo-pathological point of view, it may be affirmed with certainty that coxarthrocace and scrofulous inflammations of the joints, spondilitis, the affections of the cornea and conjunctiva, otorrhœa, and scrofulous diseases of the skin, *are not usually due to tuberculosis of the affected parts.* But, in practice, the physician is continually witnessing the fact that the two diseases just mentioned are (1), by no means local troubles, but partly alternate with each other, partly occur simultaneously on different parts of the body; (2), that such children are *always* the progeny of tuberculous parents; and (3), that, after the disappearance of the scrofulous affections, which usually occurs about the commencement of puberty, these persons always become more or less intensely tuberculous.

In practice, then, the physician cannot do otherwise; he must assume the existence of an intimate connection between the two cachexiæ. But the pathological anatomist, who devotes his attention more to the morbid products than to their origin, may very well consider the produced alterations separately. Still, even pathological anatomy shows, in very many instances, the material connection between the two. In almost all infantile cadavers, which reveal any scrofulous lesions, or affections of the bones or lymphatics, there will also be found within, generally in the bronchial glands, one or more large, yellow, cheesy tubercles, which are to be looked upon as the root, as the starting-point, of the numerous peripheral scrofulous affections.

Having thus established the connection between the two cachexiæ, we may now pass on to their separate consideration: (A), tuberculosis, and (B), scrofulosis.

A.—*THE TUBERCULOUS CACHEXIA.*

Since, in the entire plan of this work, the diseases have been treated of according to the individual organs, and not according to the nature of the pathological alterations, tuberculosis has therefore already been frequently discussed; and, in order to avoid repetitions, we refer the student to the former sections. Tuberculosis of the lungs will be found described on page 309, that of the bronchial glands on page 311; of the brain, on page 339; of the ear, page 433;

of the mesenteric, on page 157; of the kidneys, on page 444; tuberculous peritonitis, on page 219. It remains only to speak of the general symptoms of tuberculosis and of its etiology. The treatment, finally, may be comprised with that of scrofula. But it is also presupposed that a knowledge of the general views of tubercles, their origin and retrograde formations, has already been acquired by the student.

General Symptoms of Tuberculosis.—When single organs are particularly severely attacked by tuberculosis, the functional disturbances of that organ will naturally become very apparent, and will eclipse the symptoms peculiar to the cachexia, as is particularly observed in tuberculosis of the lungs, of the brain, and of the peritonæum. Very generally, however, when the intensity is less boldly stamped on a single affected organ, the following tolerably constant general symptoms make their appearance:

The *color of the face*, in general, is pale, sallow, and anæmic; the cheeks frequently display a unilateral circumscribed redness, which disappears after a few hours. Severe disturbances of the circulation in the lungs, or very voluminous bronchial glands, may also induce serious dyspnœa, followed by death. Most of the tuberculous children bear a painfully-sad expression in their countenances; the lethargic movements of the eyelids and of the globe, the sclerotica of which becomes markedly bluish, give them an extremely peculiar appearance.

The *fever*, consisting in an increased temperature of the skin and accelerated pulse, is a constant symptom in general tuberculosis. But a distinction should be made between the usual frequently exacerbating vascular excitement of chronic tuberculosis and hectic fever, which comes on in the last stage, and continues until death ensues. All tuberculous children frequently, especially toward evening, have a hot, dry forehead and hands, increased thirst, and a general heightened temperature of the skin; but all of these symptoms disappear after a few hours, and often do not recur for weeks. The nutrition of the children does not materially suffer from these transient vascular excitements, and the latter may also disappear entirely if no new tuberculous injuries ensue.

The case is entirely different with *hectic fever*. The pulse, which at first is hard, later on small and compressible, rises to 150 beats and more per minute. Every evening an exacerbation ensues, but no complete feverless condition ever takes place again. This fever may last for months, and even years; in the latter case, naturally, it is less intense, but it induces an emaciation down to a mere skeleton, and does not forsake the child until death. Toward the end, the temperature of the skin, according to the feel, does not rise in

exact relation to the acceleration of the pulse; on the extremities it is more apt to sink to below the normal state.

At the commencement of tuberculosis, or when the sick child is not watched long enough by us, this fever is apt to mislead our diagnosis. The vespertine exacerbations may simulate an intermittent, but this error soon becomes manifest from the failure attending upon the use of large doses of quinine. Occasionally, the diagnosis vacillates, for several weeks, between acute tuberculosis and typhus fever, and this is all the more likely to happen in children, as infantile typhus has fewer well-pronounced symptoms than typhus fever in the adult. Even when the tuberculous pulmonary symptoms are somewhat more predominating, it is often a question whether the continuous fever may not be prolonged by a pneumonia that runs an irregular course.

The nutrition suffers markedly in all tuberculous children, and an alarming emaciation soon ensues, which, however, as a diagnostic sign, is of no great importance, as it is also produced by all febrile, protracted infantile diseases. Acute tuberculosis of children under one year is an exception in this regard. These children retain their plumpness almost until death, especially if they nurse at the breast of their mother; but the constant hot skin, and the incessant cough, with which a great deal of white froth is expelled from the mouth, permit one to form a diagnosis of acute tuberculosis with the utmost probability, and the autopsy, in most instances, confirms this approximative diagnosis.

When thrush forms upon the mucous membrane of the mouth, in older tuberculous children, a speedy lethal end may be predicted, almost with certainty. The tongue presents but little that is characteristic. The appetite is frequently still fair, even when hectic fever has already set in; on the whole, it is not noticeable that these children become less emaciated, and live longer, than others which suffer from continuous dyspepsia. Diarrhœas are frequently observed, but not always due to ulceration of the intestines; in most instances they are the effects of simple catarrh of the intestinal mucous membrane.

The *skin*, in chronic tuberculosis, is never normal; it loses its original smoothness, and becomes flabby and corrugated in consequence of the diminution of the subcutaneous adipose tissue. A furfuraceous desquamation frequently takes place upon the trunk and neck, which disappears for some time, but soon returns again, and becomes complicated with pityriasis versicolor. The strongly-desquamating, denuded spots perspire but little; the others, however, as an offset, all the more profusely. The perspiration, especially about the

head, is seen to gather in large drops, wetting the hairs and pillow Conformably therewith, sudamina are often observed in large numbers.

General œdema does not occur in simple tuberculosis; in the last stage, however, a slight œdema, about the ankles and dorsum of the feet, takes place. In infants, this œdema is a safe cardinal point, for it is almost exclusively seen in tuberculosis, and the physical examination of the chest usually furnishes no satisfactory signs. Occasionally, a partial œdema of the face, and of the upper extremities, originates, and is due to local derangements of the circulation. Greatly enlarged bronchial glands have been observed to exercise pressure upon the vena cava descendens, and thus cause stagnation in its vascular sphere.

Chronic tuberculosis either retains its character till death, and the patients die from the effects of the fever, of the emaciation, and of the exhaustion, or the lethal end is accelerated by miliary tuberculosis and acute hydrocephalus.

The *prognosis* need not be put down as absolutely fatal, even in tolerably advanced tuberculosis, for cases occur in which, notwithstanding all the bad signs, an arrest nevertheless ensues, and, after many years of sickness, perfect nutrition and progressive development finally take place again.

Etiology.—There is no disease that is so positively inheritable as tuberculosis, and this inheritability is so clearly demonstrable, in many cases, that I suspect it is the only and true cause of the cachexia. True, children bring no ready tubercles with them into the world, and, so far as I am aware, none are ever found at autopsies of the new-born, but tuberculosis may completely develop itself as early as the first few weeks of life; so that miliary, and occasionally large tubercles are found in an infant that only lived two or three months.

The intensity varies very much in degree, according to the kind of constitutions the parents have. If only one of the parents is tuberculous, and the other comes from a perfectly healthy family, then all the progeny of this alliance need not necessarily be tuberculous, nor even scrofulous. It fares just the same way with the inherita bility of tuberculosis as with the formation of the body. When the father has black hair and brown iris, the mother blond hair and blue iris, then the children usually have *no* mixture of these variegations of color; but, in most instances, a portion of them will take entirely after the father, another after the mother. Now, when the father is tuberculous, but the mother healthy, or *vice versa*, it may very well happen that a part of the children will be perfectly sound, another decidedly tuberculous. Frequently, however, a weakening of the

cachexia, which manifests itself by milder scrofulous forms, is observed on the one hand, and, on the other, slight scrofulous affections and a disposition to bronchitis, chronic blepharitis, and phlyctenular conjunctivitis, in apparently perfectly healthy children.

Now, by "crossings" between strongly tuberculous, feebly tuberculous, and healthy persons, a number of gradations originate; and in the limitless extent to which the cachexia has now attained, but very few families will be found to have remained perfectly free from all dispositions to tuberculosis, and from all the scrofulous symptoms which point to it. The chief difficulty that has to be overcome, when the attempt is made to explain the origin of tuberculosis by the inheritability alone, is this, that especially the milder grades of tuberculosis, some circumscribed, perhaps even cretaceous tubercles, are not diagnosticable. Very frequently, in fact, the residue of a former tuberculous process, of which no one had the least idea, is found in the apices of the lungs or bronchial glands, at the autopsies of the strongest, best-developed individuals who succumbed to some acute disease. Consequently, it is never possible to maintain, with any degree of certainty, that there is no hereditary disposition, and that the tuberculosis, in a given case, has to be produced entirely by external causes.

The following are generally considered the external causations of tuberculosis: bad air, confinement in close, imperfectly-ventilated, dusty rooms, damp houses, and bad food, by which, living exclusively on rye bread and potatoes, and the deprivation of animal food, is understood. But if any deductions regarding these external causes can be drawn from a large poor practice, such as mine has been for the last few years, then it becomes pretty evident that tuberculosis is very rarely generated by them; and, on the other hand, it is very often found where these external causes are entirely absent.

The circumstances are most strikingly manifest when children of different parents grow up in one family, a very frequent occurrence in the case of illegitimate children who cannot remain with their mothers, but have to be boarded in another family. Now, when the family that have taken charge of this child have children of their own, all the children will live together under the same circumstances. They sleep in the same rooms, they eat from the same dish, they are alike neglected as regards attention to the skin, and yet it is observed scores of times that the strange child remains perfectly well, while their own children are the whole year through under treatment for scrofulous affections, or that the contrary happens to be the case. Now, when these facts recur so often that every busy physician is able to count them in large numbers, the faith in external causes, unwholesome food, bad air, in-

attention to the skin, becomes more than vacillating, since, among the great masses of proletarians who live crowded together in large cities, tuberculosis would have to be still more frequent than is actually the case. Entire houses, and even streets, in which these poor people are huddled together, ought to be tuberculous, a circumstance which, so far as I am aware, has never been observed in any city.

These external causes may be of the utmost importance for children who bear the germ of tuberculosis, and increase and aggravate the kind as well as the number of the single exacerbations; where, however, the former does not exist, the children certainly develop slower, remain pale, lean, and small, yet do not exhibit tuberculosis, nor even scrofulosis.

Let us consider the affair from the opposite direction. In children of the opulent classes these external causes are entirely absent, and thus fewer children of the affluent ought to be tuberculous than of the poor who may have become so through the unfavorable circumstances under which they are situated. But, so far as the general survey reaches (these circumstances cannot be calculated by per cents.), it is found that children of the rich are not less frequently tuberculous than those of the poor, nay, more, the disease seems to occur oftener and more predominantly in the former class. This view also results in the fact, that by far less weight ought to be placed upon bad diet, residence, and inattention to the skin, than upon the hereditary disposition.

Although the external causes are of but slight importance in regard to generating tuberculosis in healthy individuals, it must nevertheless be acknowledged that they become powerful agents where the hereditary disposition exists. In this respect, however, other preceding diseases are of more importance, especially measles, syphilis, whooping-cough, and typhus fever. After these maladies, tuberculosis suddenly develops itself in children who formerly were apparently perfectly well. It most frequently comes on after measles; here it is such a frequent follower, that the assumption, that no child with an hereditary disposition is attacked by measles who does not subsequently become tuberculous or at least scrofulous, seems justifiable. This tuberculosis following upon measles distinguishes itself, from that of the spontaneously originated, by the fact that an arrest, and finally even a decided improvement, is much more frequently observed in it than in the latter kind.

B.—*THE SCROFULOUS CACHEXIA.*

By scrofulosis we understand a series of inflammatory processes upon the *skin* and *mucous membranes*, on the *organs of sense*, *sight* and *hearing*, in the *lymphatic glands*, and on the *bones* and *joints*,

which, anatomo-pathologically, *have no connection whatever*. They differ materially in their course from simple traumatic inflammations of these parts, and seldom occur singly, but in most instances on several parts of the body at the same time.

Examination of the affected parts alone, even without taking into consideration the entire state of the organism, often furnishes such peculiarities that the adjective "scrofulosus" may be added to the name of the inflammatory process with the utmost surety. This remark is especially applicable to some of the diseases of the eye, to the ulcerating lymphatic glands, and the affections of the bones and joints, while most of the cutaneous eruptions, catarrhs of the mucous membranes, and otorrhœa, can only be recognized as being cachectic by the obstinacy of their course and complication with markedly scrofulous affections of other organs.

The opponents of the scrofulous diathesis theory, who obstinately shut their eyes against the manifest common and intimate connection between the affections just mentioned, fall back upon this argument in particular, that the *cachexia has not been shown to be present in the blood*. Singularly enough, they forget that, in none of the dyscrasiæ in general, neither in syphilis, nor in carcinoma, nor in tuberculosis, has it been possible to detect any thing specific in the blood; but that general diseases are here in question has been emphatically acknowledged by all thoughtful physicians.

The following principles must be maintained from a clinical point of view:

(1.) There are certain chronic inflammations which have an intimate etiological connection.

(2.) Children affected by them are, in greater part, the progeny of tuberculous parents; and

(3.) These children very frequently become tuberculous after the appearance of puberty, even when the scrofulous phenomena have disappeared long before.

Scrofula therefore seems to be the commencement—perhaps, also, an imperfect development of tuberculosis. According to my observations, which, unfortunately, on account of the difficulties attending upon the demonstration of tuberculosis in the parents, have never led to precise results, it occurs principally in families where one of the parents is healthy, but the other tuberculous. Where both father and mother are tuberculous, most of the children perish in the first few years of life, from true tuberculosis, and overleap these milder transitions altogether.

As regards the general symptoms of the so-called scrofulous dia-