

TUBERCULOUS NEUROSES OF
CHILDHOOD.

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Reprinted from
ARCHIVES OF PEDIATRICS,
May, 1893.

NEW YORK:
M. J. ROONEY, PRINTER AND PUBLISHER,
114-120 W. 30th St.



TUBERCULOUS NEUROSES OF CHILDHOOD.

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It is the purpose of this paper to consider the etiology of the neuroses of childhood, and in so doing to call special attention to tuberculosis as a most important etiological factor of these diseases. This factor, strangely enough, has been almost overlooked in the study of these diseases.

A child with a neurotic family history contracts tuberculosis. The tuberculosis produces an anæmia. The anæmia causes a malnutrition of the nerve elements. This malnutrition increases the hypersensitiveness and instability of the ganglion cells or other nerve elements of the central nervous system. With the child in this condition, a fright, mental strain, or some other simple exciting cause is sufficient to upset the nervous equilibrium and precipitate an attack of one of the numerous neuroses of childhood.

In leading up to this line of thought I would ask special attention to certain questions bearing on the cause and frequency of scrofula, since as we shall see further on, this is the form of tuberculosis most frequently associated with the neuroses.



I.—*Tuberculosis and nervous diseases have an intimate relationship.*—The relationship of tuberculosis to certain nervous diseases, more especially idiocy and insanity, has been noted by many medical writers. Dr. Langdon Down* says, "I have made an analysis of the last one hundred of my post-mortem records at the Earlswood Asylum for Idiots, and I find that no fewer than 62 per cent. were subjects of tubercular deposits." Dr. Ireland† says, "Perhaps two-thirds or even more of all idiots are of the scrofulous constitution," for "fully two-thirds of all idiots die of phthisis," "the scrofulous diathesis therefore seems to favor, or at least, to accompany the production of idiocy."

Dr. Clouston ‡ says of tuberculosis and insanity, "It is very common to find these two diseases in different members of the same family, and there is every reason to suppose, from the facts, that an heredity toward phthisis may determine insanity and vice versa. The percentage of deaths from tuberculosis is four times higher among the insane than among the general population at the same ages." Clouston also believes that a trophic neurosis produces a "pulmonary innutrition that admits of the tubercle bacillus finding a nidus in the lungs," and concludes that "if tuberculosis cannot of itself be called a neurosis, it is in most cases dependent for its existence on a trophic neurosis or has the closest affinity to it." In our own country Dr. Mays§ has called attention to the close relationship existing between tuberculosis and certain nervous diseases and concludes "that the link that binds pulmonary phthisis to insanity and to other neuroses is disease of the vagi."

Even though we may not believe with Clouston that tuberculosis obtains a foothold in the body through a trophic lesion, or with Mays in the neurotic origin of pulmonary tuberculosis, we may yet accept their testimony

* Mental Affections of Childhood and Youth.

† On Idiocy and Imbecility.

‡ The Neuroses of Development.

§ Pulmonary Consumption a Nervous Disease.

to the fact that there is a relationship between tuberculosis and certain nervous diseases. But it is not necessary to multiply witnesses to the well established clinical relationship existing between tuberculosis and certain neuroses. I wish here only to call attention to this relationship, as an established fact, leaving my own idea of the nature of this relationship so far as the neuroses of childhood are concerned, to be discovered in the further discussion of this subject.

II.—*Tuberculosis is, especially among the poor, the most frequent disease of childhood.*—This, I think, is the opinion to which all hospital and dispensary physicians must come. The clinical records of the Children's Clinic at the Medical College of Ohio, show 407 cases in 4,400. That is to say, of the past 4,400 cases treated at this clinic 10 per cent. were tuberculous. Of 10,000 cases treated in Steiner's Clinic, 12 per cent. were scrofulous. And even this large percentage, as Carmichael graphically tells us, is very much increased when children are crowded together with bad hygienic surroundings and improper food. He concludes as follows: "On closer examination of these 400 or 500 children (in the House of Industry) it was found that more than one-half of these unhappy children had the characteristic signs of scrofula in their necks."

Tuberculosis is therefore an awful scourge among the children of the poor, and it is not an infrequent disease among children of the rich. And the reasons why tuberculosis is more prevalent among the poor than the rich, are of importance to us in this discussion.

Heredity, which is one of the most important factors in the production of tuberculosis, exerts its evil influence chiefly among the poor. The ancestors of the poor have, as a rule, been poor, and have lived as their children now live on improper food and under *bad hygienic conditions*, and have been, as their children now are, unusually exposed by overcrowding to the contagion of this disease. The evil influences of heredity are, therefore, more felt among the poor than among the rich. In a recent paper,

Dr. Christopher^{||} lays much stress on improper food or starvation as an important factor in the production of the neuroses.

In my opinion, improper food and bad hygiene are, for the most part, only indirect factors in bringing about the conditions upon which the neuroses depend. They act chiefly by improving the conditions for tuberculous infection, and in facilitating the progress of this disease after it has once infected the body. In my paper ¶ on "The Anæmia of Tuberculosis," I said: "If we study the influence of lack of food and bad hygiene in producing anæmia in girls before they entered the convent, we find, that those who suffered most from these causes before entering the convent and were the slowest to recover from the effects of these influences after entering the convent, were the girls with tubercular family histories. I am led by this investigation therefore to believe that, while lack of food and bad hygiene are undoubtedly direct causes of anæmia, it is probable that the most deleterious influence of these factors is exerted in an indirect way, by predisposing to and prolonging attacks of tuberculosis." We may therefore, I think, conclude that poor food and bad hygiene, as a rule, exert their worst influences in children by promoting the spread and virulence of tuberculosis. And bad hygiene is, in my opinion, much more potent for ill in this regard than is improper food. Niemeyer* says, "The average diet of the population of many poor villages is much worse than the diet of children in asylums and other crowded public institutions, and yet tuberculosis is not nearly so common among the villagers as among the inmates of institutions." I will, therefore, in the further discussion of this subject consider that bad hygiene and improper food influence the blood state chiefly by promoting the spread and virulence of tuberculosis, which is, as we have just seen, the most common disease of childhood.

^{||} ARCHIVES OF PEDIATRICS, August, '92.

[¶] *Ibid.*, November, '92.

* Practice of Medicine.

III.—*Scrofula is chiefly a disease of infancy and childhood.*

—This fact is testified to by Asby, Osler, Lynch, Steiner and all other writers, ancient and modern. Dr. James proves by statistics that scrofula is preëminently a disease of childhood, the great majority of cases occurring between the ages of three and fifteen. Dr. J. Lewis Smith† says, “Scrofulous manifestations after the age of twenty are feeble and infrequent,” and this is a point that I wish here to emphasize, the ravages of scrofula with infrequent exceptions are confined to childhood, and even the pulmonary tuberculosis of adults is not, as a rule, complicated with this disease. Among two hundred and thirty-nine convent girls recently examined by me there were nineteen cases of pulmonary tuberculosis in girls over twenty years of age. Yet none of these nineteen girls showed any evidence of scrofula. Scrofula then is a disease that almost always begins and usually ends during childhood.

IV.—*Scrofula is the most frequent and important form of tuberculosis in childhood.*—Of the 407 cases of tuberculosis taken from the records of my clinic, 280 were scrofula and 121 were phthisis. These figures show that scrofula is very much the most important form of tuberculosis in childhood. But they also show that pulmonary tuberculosis is a very important disease of childhood. But while pulmonary tuberculosis is a very common disease, it is, as a rule, in children complicated with scrofula. Lymphatic enlargement is quite characteristic of phthisis in children, and the incomplete clinical records do not always show this complication where it exists. Niemeyer in speaking of the relationship of scrofula and pulmonary consumption, said, “It very frequently happens, especially during childhood, that the lymphatic glands participate in this morbid process.” Scrofula, therefore, not only complicates most of the cases of phthisis in children, but also exists as an independent disease in the majority of cases. We may conclude, therefore, that in the

† Diseases of Children.

majority of cases of tuberculosis in childhood the lymphatic glands or other blood forming organs are involved. The comparative frequency of scrofula is not the only reason why it is the most important form of tuberculosis in the production of the neuroses of childhood. There is another and more important reason, as we shall now see, in the fact that scrofula is the form of tuberculosis that produces the most profound anæmia.

V.—*Scrofula rather than pulmonary tuberculosis is the most important cause of chronic anæmia in children.*—That scrofula is by far the most important cause of anæmia in young convent girls, is, I think, satisfactorily demonstrated in my paper ‡ on the "Anæmia of Tuberculosis," wherein from an inquiry into the blood state of two hundred and eighteen convent girls, I demonstrated that tuberculosis of the lymph glands was the all important cause of anæmia among these girls, and I further demonstrated that this lymphatic tuberculosis, although producing the most profound anæmia, was very frequently *concealed*, that is to say, was confined to the deep-seated or hidden lymphatic tissues of the abdomen and chest. I further insisted that this concealed form of tuberculosis was very common and might readily be overlooked if the superficial lymphatics gave no suggestion of the deep-seated lymphatic disease, and moreover that the severity of the disease might readily be underestimated even when the external lymphatics were involved, if one judged of the severity of the deep-seated disease by the superficial glandular enlargement. I also expressed a belief which is now a conviction, that scrofula either apparent or concealed, was one of the most important causes of anæmia in childhood. So important a cause of anæmia did I find tubercular disease of the glands to be, that I offered the following rule of practice founded on the strongest of circumstantial evidence, that "well-marked anæmia without apparent cause is strongly suggestive of concealed tuberculosis, and when to this is added a family history of

‡ ARCHIVES OF PEDIATRICS, November, '92.

tuberculosis, I believed one was justified in making the diagnosis of tuberculous anæmia." From the evidence given in this paper, I think I was justified in the conclusion that tuberculosis is the most common cause of anæmia in children. In this paper I also demonstrated that beginning pulmonary tuberculosis might cause only a very slight anæmia, while scrofula always produced a profound anæmia. It was scrofula, the form of tuberculosis most prevalent in children, rather than pulmonary tuberculosis that produced the most marked anæmia. I further showed that bad hygiene and improper food was an important cause of anæmia in childhood, but these causes acted for the most part by predisposing to and prolonging attacks of tuberculosis. Tuberculosis assisted by lack of proper food and bad hygiene, is therefore, the great cause of anæmia in children.

The anæmia produced by scrofula may be very profound. I have found in cases that afterward recovered, the hæmoglobin reduced to 25 or 30 per cent., and the corpuscles to 1,500,000 to the cubic mil. In fact, I have never found such profound anæmias, as those produced by scrofula, in any other diseases, except infantile scurvy and purpura hæmorrhagica. § Scrofulous anæmia is essentially a chronic anæmia depending on a chronic disease and it persists for months or years until the cause is relieved. But scrofula is not the only important cause of chronic anæmia in childhood, there are other diseases such as rheumatism, malaria, and inherited syphilis that produce a most profound and lasting anæmia, and are therefore of much importance to us in the study of the etiology of the neuroses of childhood.

VI.—*Rheumatism, Malaria and Syphilis are also important causes of chronic anæmia in childhood.*—Next to scrofula, rheumatism is the most important cause of chronic anæmia in children. Rheumatism in childhood is essentially a chronic disease and may manifest itself as Cheadle || tells us in very many different forms,

§ *Medical News*, Philadelphia, October 15, 1892.

|| Rheumatic State in Childhood.

during the entire period of childhood. The rheumatism poison may remain in the system for years without marked joint symptoms and yet be exercising a destructive influence on red-corpuscles and in this way producing a chronic anæmia. Cheadle says, "Dr. Goodhart thinks, further, that even children of rheumatic parentage are often habitually anæmic, others again have regarded anæmia as a predisposing cause of rheumatism." "It may be that the inherited rheumatic taint gives the tendency to anæmia and that the rheumatism is the antecedent of the anæmia, not the anæmia of rheumatism. Be this as it may, however, where the rheumatic state is actively developed, anæmia proceeds apace in children. The presence of the rheumatic poison appears to be inimical to the red-corpuscles or their hæmatin, it either produces their disintegration or interferes with their production." Trousseau^{||} affirms that there is perhaps, no acute disease which produces anæmia so rapidly as rheumatism. My own experience leads me to believe that there is no other chronic disease except scrofula that produces so great an impoverishment of the blood. A few days ago I examined a patient's blood who was convalescent from a sharp attack of rheumatism. The hæmoglobin was 50 per cent. of the normal amount, and the corpuscles 2,300,000 to the cubic mil. This degree of anæmia is not at all an uncommon condition in a rheumatic child, and this rheumatic anæmia is essentially a chronic anæmia.

Malaria is also an important cause of chronic anæmia in childhood. Dr. F. Forchheimer[¶] says, "The prime and principal lesion of malaria is that of the blood." "Malarial cachexia is the usual concomitant of chronic malaria in children," and "children having the cachexia are emaciated and extremely anæmic." That malaria can produce a most profound anæmia and that this anæmia is essentially a chronic anæmia is the testimony of all medical writers on malaria. My own experi-

^{||} Clin. Med., Vol. lv., p. 454.

[¶] Malaria. Keating, Cyclopedia of Diseases of Childhood, Vol. i.

ence leads me to believe that in the Ohio Valley malaria is the third and most important cause of chronic anæmia in children.

Inherited syphilis is another important cause of chronic anæmia in childhood, and in my opinion is the fourth most important cause of anæmia among the children of the poor, as seen in dispensary practice. It is not within the scope or limits of this paper to discuss in detail the extent or character of the changes which these diseases produce on the blood. All I desire to do here is to impress the fact that there are at least four great causes of chronic anæmia in childhood: 1st. Tuberculosis, especially scrofula, assisted by bad hygiene and improper food; 2d. Rheumatism; 3d. Malaria; 4th. Inherited syphilis, and that these causes in dispensary practice are of importance in the order named. But my experience leads me to believe that in private practice, among the children of the upper and middle classes, the relative importance of these causes are slightly changed. In private practice syphilis is a much less important cause of anæmia than in dispensary practice. Yet it is a cause always to be searched for and one that is often found where least suspected. Scrofula is also a disease of much more importance in dispensary than in private practice, but it probably yet remains the most common cause of anæmia in childhood. Rheumatism is more frequent among the better classes and is, therefore, of much more importance in private than in dispensary practice. It probably takes almost, if not quite, equal rank with tuberculosis as an anæmia producer among the rich. Malaria is a sectional disease and, therefore, its importance as an anæmia producer differs widely in different parts of the country. No doubt, in some of the malarious districts of the South, where tuberculosis and rheumatism are not as prevalent as they are in the Ohio Valley, malaria is the most important cause of chronic anæmia. So the relative importance of these four factors may vary with these and other conditions, and they are assigned to the places given

them in this paper, from a study of anæmia as it occurs among dispensary patients in Cincinnati, Ohio.

I would also call attention to the fact that the four diseases which are the most important causes of chronic anæmia in childhood, are the four great chronic diseases that have latent stages, and that produce morbid changes, especially in the blood forming organs, viz., lymph glands, spleen, tonsils, bone, etc. There are many other diseases, such as scarlet fever, diphtheria, measles and, in fact, all of the zymotic diseases that produce marked anæmia, but these diseases are acute, and they produce an acute anæmia that disappears during convalescence from the self-limited disease that produced it. That these acute and temporary anæmias are not nearly as important factors in the production of the neuroses of childhood as the chronic anæmias are, will be shown in the further discussion of this subject.

VII.—*Chronic anæmia can produce an irritable and unstable condition of the nerve elements.*—That anæmic individuals, as a rule, are nervous is a clinical observation that every physician has made. Cure the anæmia to cure the nervousness is a rule of practice that has been followed by good results. Dr. J. Lewis Smith says, "among the most common predisposing causes of chorea is anæmia." But fortunately the proof of the above proposition does not depend alone on clinical evidence.

We have ample experimental evidence to prove that anæmia produces an irritable and unstable condition of the nerve elements, and that this irritable and excitable condition of the nerve centres becomes more and more marked if the anæmia continues. So that in chronic anæmia we would expect to find the greatest excitability and irritability of the nerve centres. One might formulate the following law: Other conditions the same, the instability and irritability of the nerve centres will be in direct proportion to the length of time the anæmia has lasted. The latest published experiments on this subject

that I have found are those of Dr. V. Adducco*, of Turin. His experiments were made on dogs. He produced anæmia of the nerve centres by cutting off a portion of the blood supply, by the partial or complete closure of blood-vessels leading to these centres. He compared the excitability of the nerve centres before and after the artificial anæmia, and in this way determined "the effect that partial anæmia exercised on the nerve centres." Dr. Adducco concludes his paper as follows: "In conclusion, I must say that the researches I have just described have led me to draw the following conclusions: In anæmia, that is to say, when the flow of blood is diminished, the active substance of the nerve centres is found in a state of great excitability. In this condition excitants from the exterior act much more energetically than in the normal condition. This state of excitability *increases* most probably during the entire duration of the anæmia. It seems to me also that one ought to be able within certain limits to admit that there is an inverse relationship between nutrition and excitability of the nerve elements. This latter augments all the time that the nutrition diminishes."

I would call attention again to the fact that these experiments demonstrate that anæmia, pure and simple, can cause this irritable condition of the nerve centres and that it is not necessary to invoke the presence of poisons in the blood to account for the excitability of the nerve elements in anæmia, and further that the anæmia produces these results by causing an innutrition of the nerve elements, but these experiments do not prove that toxic agents in the blood may not be an additional factor in producing the irritable condition of the nerve centres always found in chronic anæmia. That toxic agents carried by the blood may produce the most violent nervous symptoms in such diseases as cholera infantum, diphtheria, scarlet fever and all the other acute infections, finds ample demonstration in the everyday practice of

* Transactions of the Tenth International Medical Congress, Vol. ii., Part 2, p. 70.

medicine. But what I here wish to emphasize is that although these agents may play a most important rôle in producing the anæmia, the anæmia itself is quite sufficient to explain the resulting nervous symptoms.

VIII.—*A neurotic inheritance is an all-important predisposing cause of the neuroses.*—Of one hundred and thirty-nine cases of neuroses of all kinds taken from the records of the Children's Clinic at the Medical College of Ohio, about 40 per cent. had a neurotic family history. In private practice one finds a much larger percentage of cases with a neurotic family history than these records show. In fact, on a careful inquiry, one can find a neurotic family history for almost every nervous child. A neurotic inheritance is therefore an all-important predisposing cause of the neuroses of childhood. But it must always be remembered that only a small proportion of children with neurotic family histories suffer from these diseases, and this is because a neurotic inheritance is purely a predisposing factor that does not of itself cause neurotic disease.

IX.—*The growth and development of the brain are important predisposing causes of the neuroses of childhood.*—Dr. Clouston† believes that the neuroses of childhood are, in great part, due to the rapid growth and development of the brain between the ages of three and fourteen. The ganglion cells and other nerve elements, during this period of rapid metabolism, are immature and unstable, and this, Dr. Clouston believes, is the all important cause of these neuroses, and no one, after reading his masterful presentation of the subject, can doubt but that rapid growth and development of the brain are, at least, important predisposing causes. But they are after all only predisposing causes that exist alike in all children, and they only help us to understand why certain neuroses should occur with greater frequency during childhood, why, for instance, a child should have chorea at nine rather than at twenty. Brain growth and development do not therefore produce the neuroses, they only predis-

† The Neuroses of Development.

pose all children to them, and those children that are pushed to rapid brain development are more predisposed to these diseases than dull children who are not and cannot be pushed to rapid mental development.

There is another reason why children with immature brain functions are more predisposed to reflex neuroses than adults are, and this is because the centre inhibiting reflex acts is very slow in developing and does not become functionally mature till childhood has passed. We come now to the consideration of the most important proposition bearing on the etiology of the neuroses of childhood, and the one which it is the special purpose of this paper to consider, viz.:

X.—*Chronic Anæmia is the great foundation cause of the neuroses of childhood.*—To this conclusion one must necessarily come from the argument already presented in the paper, if it can be shown that neurotic disease is, as a rule, associated with the conditions that produce chronic anæmia in children. But since it is the special purpose of this paper to study the importance of tubercular anæmia as an etiological factor in the neuroses of childhood, I will have to confine my investigations to the study of this relationship only, leaving the etiological importance of rheumatic, malarial and syphilitic anæmia for statistical investigation at some future time. The following typical case will show the relationship between scrofulous anæmia and chorea and will also serve as a text for the further discussion of this subject.

December 17.—L. B., girl, nine years old. Diagnosis, scrofulous chorea. Family history: Maternal side, grandmother and aunt died of phthisis; her mother had rheumatism thirteen years ago, and is now delicate and suffers much from "pains in the side" and nervous headaches. Paternal side: One aunt died of phthisis and one of tubercular meningitis, grandfather, father and aunts have nervous headaches.

Personal history: She has a brother, six years old, who has general lymphatic enlargement. She had "milk crust" on head during first year of life. She has always been "subject to croup" and has a "bronchial attack" every winter. Two years ago she had scarlet fever and

diphtheria, but she never had rheumatism. She has not been well since she had the measles four months ago. About one month after the attack of the measles her present attack of chorea began.

Present condition: Very anæmic; blood exam. 50 per cent. of hb. and 2,400,000 corpuscles to the cubic mil. She is poorly nourished and has general lymphatic enlargement. She has had chorea for three months, and during this time she has been under the care of physicians who gave her arsenic, but she did not improve under this treatment, and when I saw her for the first time choreic movements were quite violent; her voice was so much affected that she could scarcely be heard at all. I ordered fresh air, good food, cod liver oil and iodide of iron. Under this treatment the patient gradually improved till on January 7th she was much improved and the hæmoglobin was 70 per cent., red corpuscles 3,200,000 to cubic mil. and the white corpuscles 1 to 800.

January 25.—Patient well. Hæmoglobin 80 per cent. and red-corpuscles 4,200,000.

In the above case the following points are worth consideration :

- * 1st. Bad neurotic family history.
- 2d. Bad tuberculous family history.
- 3d. Patient had scrofulous anæmia, and is poorly nourished.
- 4th. Patient has chorea.
- 5th. The blood state and the chorea gradually improve under fresh air, good food, cod liver oil, and iodide of iron. The above case had chronic scrofulous anæmia. This anæmia, as we have seen, would produce an abnormal excitability of the nerve centres, which in this child with a neurotic inheritance was sufficient to cause an attack of chorea. That the chorea was, at least in part, dependent on the anæmia, is proven by the fact that the chorea and the anæmia improved apace under the treatment directed exclusively against the scrofulous anæmia. In this we have the therapeutic test of the correctness of a theory, and this is the test that appeals most strongly to us as practicing physicians.

If it be true that tubercular anæmia is one of the most important etiological factors of the neuroses of childhood, it is of the greatest importance to us as clinicians that we should recognize this fact. We cannot change the child's ancestry. We cannot stop the brain development, but we can, as a rule, cure the tubercular anæmia, and in that way cure the neurosis dependent on it. The following figures must therefore be of much interest and importance, since in the light of the preceding argument they seem to prove that tubercular anæmia is one of the most important etiological factors of the neuroses of childhood. Out of 407 cases of tuberculosis under fourteen years of age, taken from the records of the Children's Clinic, Medical College, Ohio, 139 cases had as a complication, or as I may say in the light of the preceding argument, had as a symptom, one of the neuroses. That is to say, 34 per cent. of all the cases of tuberculosis occurring in dispensary practice in Cincinnati, Ohio, have some well-marked neurosis. Of the 139 neurotic cases from the records, 30 had chorea, 23 had incontinence of urine, and 80 had other neuroses. Among other neuroses are included persistent headache, epilepsy, night terrors, laryngismus stridulus, hysteria, etc. That 34 per cent. of tubercular cases in dispensary practice have a well marked neurosis is surely a startling statement, yet it is a statement for which I do not have to make excuses since it is based on statistics and not on theory. It does not of course follow that tuberculosis was the most important etiological factor in all of these cases. A few of these cases also had malaria, and three of the chorea cases gave some evidence of rheumatism. But the number of cases included in this list that gave evidences of chronic disease other than tuberculosis are so few that, if excluded, these figures would not be materially changed. This being true, I think we may fairly conclude from what has previously been said, that the 139 cases of neurotic disease, associated with tuberculosis, must, for the most part have had tubercular anæmia, and this, in the

light of Adducco experiments, must lead to the conclusion that the tuberculosis was at least one of the important etiological factors in these cases. But the conclusion that the cases of tuberculosis having neurotic disease were anæmic, does not depend alone on the argument that tuberculosis, as a rule, produces anæmia and anæmia sometimes produces neurotic disease, for in all the recent cases it was demonstrated by a blood examination that all patients, having a neurosis complicating tuberculosis, were *invariably* anæmic, and I have yet to find, after a wide experience in this field of work, a single case of tuberculosis with a neurotic complication that did not show a marked reduction of both hæmoglobin and blood corpuscles.

If instead of noting the cases of tuberculosis complicated with neurotic disease, we inquire into the percentage of cases of neurotic disease showing evidence of tuberculosis, we find the figures not less convincing. Of 61 cases of chorea in dispensary practice, I found that 30 gave evidence of tuberculosis, and this same percentage holds for all the other neuroses. I have found that about forty or fifty per cent. of all the neurotic cases treated in my clinic show evidence of tuberculosis. These facts also bear testimony that tuberculosis is a very important etiological factor of the neuroses of childhood.

The final conclusion, therefore, to which all the argument in this paper leads is that *chronic anæmia is an all-important factor in producing the neuroses of childhood, and that the important causes of this chronic anæmia are syphilis, malaria, rheumatism, and tuberculosis; and that tuberculosis, which, for the most part, has been overlooked as an etiological factor of these diseases, is here shown to be one of the most important, if not the most important, factor of all.*

But I must here again note that I do not underestimate the importance of predisposing factors, such as neurotic inheritance and brain development, which make it possible for the anæmia to develop the neuroses, nor of such exciting causes as fright, adherent prepuce, etc., which

may precipitate an attack of one of the neuroses in a child which by inheritance and anæmia has been prepared for these diseases. All I wish to do is to give to anæmia, and especially tubercular anæmia, the important position it deserves as a factor in the etiology of the neuroses of childhood.

In conclusion, I would say that the form of pulmonary tuberculosis of most importance in producing neurotic disease is, in my opinion, scrofula or disease of the lymphatic glands. This opinion is confirmed by the following figures: Of 30 cases of chorea associated with tuberculosis, 20 had scrofula and 10 had phthisis. Of 23 cases of incontinence of urine, 16 had scrofula and 7 had phthisis. Of 86 cases of other neuroses, 55 had scrofula and 31 had phthisis. The relative importance of scrofula is probably much greater than is shown by these figures, since I have elsewhere found † that it is scrofula rather than tuberculosis that produces the most marked anæmia, and since, as I have before noted in this paper, many of the cases of phthisis in childhood are complicated by scrofula.

I am greatly indebted to Dr. Frank Southgate for time and labor spent in searching clinical records.

