

mal. He had been taking 15 grains of the mixed bromides three times a day without much improvement, when five grains of borax were added to the mixture, after which he was free from fits for 15 months, though just previously to the addition of borax he was having as many as 11 fits in a week. In some instances belladonna was found useful, especially in cases of *petit mal*, but it is very uncertain. The effect of a surgical operation is illustrated by a child who had been having fits once a fortnight, when she had her adenoids removed, after which she remained free from the fits up to the present time (15 months). It is difficult to regard this as merely a coincidence.

Conclusion.—From what has been said in the foregoing it will be easily gathered that we are compelled to take a serious view of all convulsions occurring in infancy, and are not justified in supposing that even a single convulsion in childhood will end with itself and have no further evil influence on the life of the child. For most of these cases which have arisen in connexion with an extrinsic cause have also had a history of heredity or alcoholism in the parents which are both predisposing causes of epilepsy. Even where there is no such history, and if we assume that a peripheral irritation is adequate in itself to produce a convulsion in a perfectly normal brain, yet the mere fact of the convulsions being often repeated makes the brain cease to be normal and creates a distinct pathological basis for the production of epilepsy. What the precise relation of such convulsions to epilepsy may be it is impossible to say, and for this reason it seems unfortunate that infantile convulsions and epilepsy in many text-books on diseases of children are dealt with in different chapters; for the impression is conveyed that there is a much greater difference between these two affections than, in my opinion, the facts seem to warrant. It is true that we find the distinction between the two emphasized by Koplik, who says "epilepsy is a true disease of the nervous system and has nothing in common with, and no demonstrable relationship to, infantile convulsions." Holt also speaks of both affections as being quite distinct, and as a result of his large experience among children we find him saying "in a highly susceptible nervous child a convulsion often means no more than an attack of migraine in an older person." It might, however, be said in passing that many physicians consider epilepsy and migraine to be nearly related. The serious view, however, here taken of infantile convulsions is borne out by Sir William Gowers, who says, "no convulsion in childhood should be looked upon as of little moment, no matter how prominent an exciting cause may be discovered." And again, "even a single fit in childhood indicates the need for careful supervision." Finally, Dr. Hughlings Jackson says, "I find it hard to believe that eccentric irritations of any sort can act on the nervous centres, when they are healthy, so as to produce a convulsion."

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HÆMOCONIA.

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AFTER eliminating the various elements of the blood of which there is more or less accurate knowledge there remain others of which there is no adequate description to be found in literature. These may be grouped into three classes: (1) cell debris; (2) parasites; and (3) hæmoconia.

The earliest reference to these less known elements of the blood is to be found in a paper by Dr. F. W. Mott and Dr. I. Blore,¹ who regarded them as micrococci. These observers describe the bodies thus: "We have examined the blood in 12 cases [of typhus fever] during the pyrexial stage, and in all, moving organisms, like minute screws, have been seen. Occasionally their form can be made out and we consider them to be dumb-bell micrococci undergoing division. Often single cocci could be seen and these were found to measure about half a micro-millimetre. In one case, there were large numbers in the blood after the fever had subsided; but, as a rule, they disappeared on convalescence."

The next observer to mention them was Doehle² who

found them to be present in the blood of patients suffering from measles, scarlet fever, small-pox, and syphilis. He described them as small spheres (from 0.5 to 1 μ) which were either homogeneous or contained a highly refractile nucleus surrounded by a clear zone. They showed movements which, in some instances, could be observed to be due to the action of a flagellum four or five times the length of the body. Occasionally two spheres were inclosed in a common capsule. He also noticed granular and amœboid elements (2.5 μ) and ill-defined rod-like protoplasmic bodies possessing small flagella. Pfeiffer³ describes similar bodies with flagella which he found in the blood of patients suffering from variola and vaccinia.

The next descriptions are those of Müller and Reed. Müller, who gave to these elements the name of "hæmoconia,"⁴ states that they are found in the blood as very small granule or cocci-like colourless corpuscles, highly refractile, with a very active molecular movement, which keep their shape under observation for a very long time without any special precautions. He found them in every normal blood in varying numbers and was unable to stain them with osmic acid. Various other observers have considered them as free granules of neutrophile or eosinophile leucocytes or produced by fragmentation of the red blood corpuscles.

Observations made by myself on the blood of patients suffering from the diseases above mentioned and on the blood of patients suffering from typhus fever have demonstrated that there exists in the blood a number of forms which may be grouped into four classes: 1. Protoplasmic bodies containing a number of bright refractile points. There is no difficulty in demonstrating the origin of these as portions of neutrophile cells when stained with Biondi's fluid. They are observed frequently in blood where disintegration of corpuscles is common, as, for example, in hæmorrhagic small-pox, but are not so frequently found in typhus fever. 2. Small round highly refractile bodies from 0.5 to 1 μ in diameter and apparently motile. 3. Rod-like bodies, also apparently motile, from 0.5 to 2 μ in length. 4. Dumb-bell forms, from 2 to 4 μ in length, and apparently motile. With regard to the last three forms, it is probable that they belong to the same class as they are all small, colourless, refractile bodies lying free in the blood plasma and endowed with active tremulous movement. They vary in shape according to the position which they occupy, but for the most part appear as described in Class 2. They are never at rest but dance about in an apparently aimless fashion, disappearing and reappearing with great rapidity as they pass out of focus or come into view again. Under certain optical conditions they appear to possess flagella, but it cannot be stated positively that these organs exist. It is interesting to note that these bodies are also found in the lymph from the early vesicles of small-pox.

In no circumstances has success been attained in staining these elements, even in the lymph of the variola vesicle, where they exist in considerable numbers. They do not stain with osmic acid or with Soudan red, my experience agreeing with that of Müller in this respect. Whether this is due to the fixing it is difficult to say, but they have never been observed except in freshly drawn fluids. All modes of fixing—heat, Hermann's solution, Fleming's solution, and corrosive sublimate—apparently destroy them, or at least cause them to disappear.

In typhus fever these bodies are constantly found in the freshly drawn blood. They are observed throughout the whole course of the disease but appear in greater numbers during the first four or five days. Apparently no prognostic significance can be attached to their presence as they are as frequently observed in fatal as in non-fatal cases. There seems to be no doubt also that these bodies possess no etiological relationship with the disease in which they are present but with regard to their abundance in many cases of typhus fever my experience tallies with that of Dr. Mott and Dr. Blore. It has been suggested that they are derived from the disintegration or fragmentation of leucocytes or red blood corpuscles but the fact that they do not stain is almost sufficient to negative this idea and their mysterious disappearance during the process of fixing renders the collapse of the theory absolute.

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³ Die Protozoen als Krankheitserreger, 1895.

¹ Micro-organisms in Typhus Fever, Brit. Med. Jour., Dec. 1st, 1883.

² Centralblatt für Allgemeine Pathologie und Pathologische Anatomie, Band iii., p. 150; Centralblatt für Bakteriologie und Parasitologie, Band xii., p. 906.

⁴ Centralblatt für Allgemeine Pathologie und Pathologische Anatomie, 1896.