

we find two apparently opposite conditions assigned as factors in causing convulsions, "increased irritability" on the one hand and lowering and depressing influences on the other, *i. e.*, the reflex excitability, the inhibitory force that controls reflex action, or both, may be at fault. The brain is not at fault more for producing than for not preventing the spasmodic seizures. If I may use a familiar illustration: we see a man driving a spirited pair of horses; if the horses are manageable and the man a competent driver, all goes right, both conditions are necessary to safety; but let some surprise suddenly excite the horses or disable the driver, or both, then the probability is that the result will be disastrous. In the same way, sudden causes which excite unduly reflex action and depress the inhibitory or controlling force, prepare some of the conditions necessary for an abnormal shock. The nervous system may be compared to complicated machinery employed in some delicate manufacture and propelled by a powerful engine; when everything is in order the machine glides smoothly and harmoniously, each part moving in the performance of its function without a jar or hitch, as if it could not do otherwise; but once let a part become confused or entangled, and the accumulated force of the engine soon does mischief, unless it is immediately put under control. When all is right, the counterbalancing resistance of the function performed steadies and holds in check the power; but once disturb or remove that and it becomes an engine of destruction, instead of construction. It is the same power that was before doing good, that is now doing mischief.

In health the vital energy is under control. There is a reserve of resisting power, not constant, but varying in quantity, in different individuals and under different circumstances. I need not multiply instances to show how persons, who are in vigorous health, can resist almost anything—as worry, pain, hunger, cold, malaria, etc., and seem to know no fear, while at other times, when under the influence of some depressing cause or causes, or in other words unnerved, they find themselves helplessly at the mercy of such influences. Infants are more impressible and have less resisting power than adults; having less mentality, and a more active organic system, they are more sensitive, being more under the influence of the sympathetic or emotional nervous system. Now assuming that

there is a definite "convulsion centre" and that increased reflex irritation, with depressed inhibitory or resisting power tends to produce partial or general spasms, I will proceed to a consideration of those convulsions more frequently occurring in infancy.

Dr. J. Lewis Smith of New York, to whom I am indebted for many of the facts in this paper, adopts the following divisions of eclampsia;—essential, symptomatic, and sympathetic. Essential, when there exists no appreciable cause which gives rise to the attacks. Example, a child dies in convulsions from fright. Symptomatic, when there is disease of the brain or spinal cord. Sympathetic, when it arises from disease elsewhere, as from pneumonia, teething, worms, &c. Now I believe that all cases of eclampsia may be regarded as sympathetic, and all the causes referred directly to the sympathetic nervous system. Take Smith's case of essential eclampsia; a child died of convulsions caused by fright. In the child fear is not a mental process, neither a rational nor intrinsic apprehension or recognition of danger; but purely an emotional excitement acting through the sympathetic, producing contraction of cerebral arteries—*anæmia* of the brain, and hence convulsions. His symptomatic division may also, in my opinion, be referred to the same class. Dr. G. Johnston, King's College Hospital, London, writing in reference to the convulsions which occur in almost every case of acute *apnœa* or sudden suffocation, says: "It is generally supposed that the convulsions of *apnœa* are excited by the circulation of black blood through the brain; but they are more probably due to the rapid and extreme *anæmia* of the brain consequent upon the impeded transit of blood through the lungs. That this is the true explanation of the convulsions of *apnœa* is rendered highly probable by the observation of Kussmaul and Tenner to the effect that the convulsions of *apnœa* in strangulation can be accelerated if the arteries are simultaneously compressed. It is obvious that if the presence of black blood in the brain were the cause of the convulsions, their approach would be retarded, and not accelerated by compression of the arteries which supply the brain. The facts are consistent only with the theory that the immediate cause of the convulsions in case of suffocation is a rapidly increasing cerebral *anæmia* resulting from the arrest of the pulmonary circula-