

the conditions of the problem of the pathology of chorea.

Before attempting to suggest a new way of viewing chorea, whereby the various symptoms may be correlated and brought into close connection with each other, I would institute a comparison between chorea and another functional disease of the nervous system—viz., migraine. It would seem at first sight that no two diseases could differ more from one another than chorea and migraine, yet on closer examination it will be found that in many points they present strong analogies. The well-marked influence of age on the development of chorea is hardly less striking in migraine, while that of sex is only less so. Hereditary predisposition is potent in both; and the relation, whatever be its nature, of chorea to rheumatism is exemplified in that of migraine to gout. Both diseases are paroxysmal in character, the one "exploding" in pain, the other in motor disturbance, and the symptoms in each case are mainly unilateral. Gastric derangements are common to both, and may be exciting causes. Sensory disturbance, frequent in migraine, occasionally occur in chorea; while motor disturbances, the leading feature of the latter, are occasionally found in migraine, and in both cases display a strong predilection for the more highly developed muscles. Finally, both diseases are prone to recur.

Two principal theories have been propounded to account for the phenomena of migraine. The one regards it as due to a disorder of the cerebral cells leading to secondary interference with the cerebral circulation; the other as due to a primary derangement of the vaso-motor centre. The latter, notwithstanding the arguments which have been brought against it, seems the more probable. I would suggest that a similar explanation may be given of chorea. That the primary change effects the vaso-motor centre, or centres, and that the muscular movements are due to secondary vascular disturbance, interfering with the nutrition of the cortical cells—recent physiology points to the cortex cerebri, not to the corpus striatum as affected in chorea,—thereby rendering them liable to take an abnormal and, as it were, independent action (a predisposition in this direction being assumed); and that, on this hypothesis, all the other symptoms of chorea admit of harmonious explanation is, I think, rendered probable by the following consideration:—

1. As regards the *cardiac phenomena* of chorea. Irregularity and acceleration of the heart's action are better explained on the assumption of deranged innervation than by referring them to some morbid cardiac condition, of which there is no evidence. That a cardiac murmur can be referred to the same source has been denied, although its occurrence in such a disease as exophthalmic goitre can hardly be explained on any other hypothesis.

Assuming, however, that cardiac innervation is in some way disturbed in chorea—and early irregularity at least points in that direction,—there is another element present, hitherto, so far as I am aware, unnoticed, which makes the occurrence of a murmur extremely likely. Chorea is a disease mainly of that period of life when the body itself is in a state of growth. In this the heart, like all other organs, shares; but unlike other organs (with the exception of the blood-vessels and the brain), the growth of the various parts of the heart does not proceed *pari passu*. The increase in weight is mainly confined to the ventricles, for the auricles lose in proportion to the ventricles up to the period of completed development of the adolescent, and it is during this very period that chorea mainly occurs; and though it occurs after adolescence, the heart is then rarely affected. That the great strain thrown upon the left ventricle by the excessive muscular movements of chorea, along with irregular arterial action in the cerebral circulation, should result in occasional regurgitation and the development of a murmur seems not improbable.

2. *The respiratory phenomena of chorea.*—Little attention has been paid to the respiratory symptoms which all admit to occur in chorea. They cannot, in every case, be referred to irregular action of the thoracic respiratory muscles. It is much more probable that they, too, are dependent upon deranged innervation, the diaphragm being immediately affected; and, as the respiratory centre is closely connected with that which controls the heart and blood-vessels, there is in and around the vaso-motor centre in the medulla oblongata a focus, interference with which may directly occasion the cardiac and respiratory, and indirectly, the motor and other, phenomena of chorea.

3. *Cessation of choreic movements during sleep.*—This feature is eminently characteristic of chorea, being, in fact, rarely absent. That some change affects the cerebral circulation, prior to the super-vention of sleep, is certain; that this change is closely connected with a variation in the blood-pressure is highly probable. One may well suppose that the cessation of the choreic movements is due to the same vascular change, pointing again to their dependence on some affection of the vaso-motor centre.

4. *The effects of treatment.*—It is beyond doubt that the removal of a palpable source of irritation may be followed by speedy cessation of chorea. In all such cases it is probable that the result is due to a decided lowering of the blood-pressure—i.e., to a change originating in the vaso-motor centre. Choreia has also yielded to large doses of chloral. In a well-known case which occurred in Glasgow a choreic patient took sixty grains of chloral, pro-found sleep verging on coma being induced; but