Original Communications.

THE NATURE OF FEVER WITH REMARKS ON SOME OF ITS PHENOMENA AND ON ITS TREATMENT.*

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GENTLEMEN,—Through your courtesy I am permitted to present some thoughts on a subject that must have engaged the attention of all whom I have the honour to address, and which is at the present time monopolizing the skill of many of the wisest and best trained minds in the world. I have thought the subject a suitable one for discussion here because its elucidation has a practical bearing on a vast number of ailments that come under daily observation, and the successful management of which determines largely the claims of the medical profession to the beneficent regard of society. I refer to those disturbances of function which are characterized by elevation of temperature, by altered nutrition, and usually by disturbances of circulation, secretion, respiration and digestion as well as by disorder of the nervous and muscular systems. I shall, after inviting attention to some of the conclusions arrived at by recent investigations in reference to the cause and nature of the febrile state, refer to some clinical facts that have engaged my attention and that have a practical bearing on the management of febrile diseases, and I shall finally point out what has been a most effectual aid in treating those diseases in which elevated temperature constitutes a prominent and dangerous symptom. The maintenance of the body at a uniform temperature under the varying conditions of life indicates a perfection in the mechanism that accomplishes it that we may readily believe to be unparalleled, and the means of its accomplishment are so various and so obscure that the secrets of the process are only being yielded up slowly, and are yet but imperfectly understood.

As fever is a disordered state of those processes by which a normal temperature is maintained, its nature will be better understood by first inquiring into these processes. We know that heat is constantly escaping from the surface of the body by radiation, conduction, and by the process of evaporation, and that heat is also used in warming and moistening the air that is exhaled from the lungs. To compensate for this loss heat must be, and is, constantly generated within the organism. If the heat production and the heat loss were equal and uniform, the nearly unvarying temperature of health would be maintained, but no argument is needed to show that these are not uniform. The variations in the temperature and humidity of the air would alone be sufficient to cause wide variations in heat loss, and there are other factors that determine this to a considerable degree. By some means, therefore, there must be generated in the body, heat equal in the aggregate to that discharged from it, and as the latter is inconstant, so must the former be inconstant. "The maintenance of a uniform body heat under these conditions implies some mechanism by which these are brought into harmony, and the mechanism which does this must be in intimate relation with heat production on the one hand and heat loss on the other, so that the smallest variation in either process will call into operation thermal tendencies whose resultant is back towards the normal" (MacAlister). Increased discharge of heat must be promptly compensated by increased production, and increased production must be immediately relieved by increased loss. The promptness with which this regulation is accomplished, the extent of tissue affected by thermal variations and the sensitiveness of the mechanism that accomplishes it, easily lead to the conclusion that this regulating apparatus is nervous, and enough has already been ascertained by observation and experiment to confirm this view. It will therefore be seen that the phenomena involved in a study of this question are heat production, heat loss and heat regulation, or as MacAlister designates the processes, thermogenesis, thermolysis and thermotaxis. A solution of these three processes would be a solution of the question of the maintenance of uniform normal temperature, and a solution of the cause and mode of disorder of any or of all of them, would be a solution of the phenomena of fever. MacAlister, to whom much is due of what is here stated, has had able co-workers in Leibermeister, Gaskell, Meade Smith, Traube, Ord, Wood, Sanderson, Welch and others, and their labours have dispelled much of

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