

**ON SIR CHARLES
BELL'S RESEARCHES IN
THE NERVOUS SYSTEM**

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On sir Charles Bell's researches in the nervous system by Alexander Shaw

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ALEXANDER SHAW

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IN THE
NERVOUS SYSTEM.



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INDEX:
BLADIRIV AND NYANG, PHOTERA, WOTTERNAKS.

NOTE.

IN explanation of the form in which this Essay is offered to the public, it may be stated, that it is a reprint of one appended to a posthumous edition of "THE ANATOMY AND PHILOSOPHY OF EXPRESSION, AS CONNECTED WITH THE FINE ARTS, by SIR CHARLES BELL."

I have thought the present a fit occasion to give a more detailed account of the author's discoveries in the Nervous System, than might seem called for to illustrate the subjects treated in that Work; and in pursuance of the desire to extend a knowledge of his services to science, beyond his own Profession, I have avoided as much as possible the use of technical phrases.

A. S.

ON

THE NERVOUS SYSTEM.

IN many parts of this work references are made to an Essay upon the Nervous System; and the last edition contained such an essay. But on examining the copy intended for the present edition, it was found that the author had drawn his pen through the essay, and had not composed another to supply its place. It cannot be doubted that he intended to reconstruct that part of the work; and as some account of his observations on the Nervous System, which bear upon the questions discussed in the volume, may be interesting, I have been requested to give a short review of his opinions. I enter upon the task with much diffidence.

It is stated, in various parts of the Essays, that a distinct Class of Nerves is provided, in the human body, for controlling the organ of Respiration; and that it is that class which is principally affected by passion and emotion, so as to give rise to the phenomena of Expression.

In Man, the organ of Breathing is constructed in such a manner, that, besides ministering to the oxygenation of the blood, its primary office in the economy, it is the instrument of Voice

and of Expression,—two properties which bear relation to his Intellectual nature. In order to adapt the organ to these endowments, it is necessary that the mechanism should have a form and arrangement distinct from that in the lower animals, where it serves for purifying the blood alone; and as a correspondence always exists between the structure of the moving parts of the frame, and the nervous system, which regulates their actions, the change in the construction of the organ is accompanied with a change in the arrangement of the nerves. Accordingly, by comparing the nervous system in the inferior animals, with its order and distribution in man, the author found that a distinct class of nerves is appropriated, in the human frame, to the organ of Respiration: and to that class he gave the name *Respiratory Nerves*.

But that conclusion was not arrived at till many other important observations had been previously made on the functions of the Nervous System. Medical science has been indebted to the author of this volume for improvements in our knowledge of the Nerves, only to be compared, for their extent and value, with those introduced by Harvey, by his discovery of the Circulation of the Blood. Although no parts of the living body have excited greater interest, since anatomy was first studied, than the Brain and the Nerves, yet when Sir Charles Bell entered upon his researches into the subject, he found it involved in so much confusion, and surrounded by so many difficulties apparently insurmountable, that physiologists had almost ceased to prosecute it. Errors on points which bore on the first elements of the inquiry, had taken deep root. He succeeded in removing these errors, and in establishing a new principle of investigation. By adopting that principle as his guide, he was rewarded not only by making discoveries of the utmost value to medicine, but by communicating a fresh impulse to the labours of other physiologists in the same field.

The error which formerly prevailed, and had the greatest effect in retarding improvement, was this:—It was taken for granted that all parts of the nervous system had certain general properties belonging to them in common; so that all were

considered alike in function. The Brain, including the Spinal Marrow, was looked upon as a common store, from which certain powers, such as that of motion, were issued to the body, and into which others, such as sensation, were received, the nerves being regarded as the conductors; and, in conformity with that view, it was further supposed that any part of the brain, or any single nerve, had equal power with all the others of bestowing the numerous properties commonly assigned to the nervous system. For the sake of illustration, let us take the nerves of the extremities, which arise from the spinal marrow. It was conceived that these nerves were all simple in structure, and that, nevertheless, they had the double property of conveying the power of motion and of sensation to the limbs: and the spinal marrow, being regarded as a prolongation of the Brain, was believed to transmit the powers of motion and of sensation along the nerves, by all its parts promiscuously.

Certain facts probably diverted the minds of physiologists from perceiving the correct views. For example, when the structure of a Nerve is examined, it is found to consist of a number of distinct fibrils, like threads, laid parallel, connected loosely together, and contained in a common sheath; and however narrowly the fibrils are inspected, it is impossible to perceive any difference between them; all are exactly alike in size, colour, and consistence. This similarity of structure, it may be supposed, would lead to the inference, that the functions of the fibrils were the same. Then, as to the Brain; although subdivided into several masses of different forms and textures, which give the appearance at first sight of its being composed of separate organs, yet a remarkable uniformity prevails in its general structure; the distinct substances of which it consists (the medullary and cineritious) are so intermingled and diffused, that it seems unavoidable to conclude that its powers are held in common, and are exercised by a combined operation of all its component parts. Again, the phenomena of certain diseases and accidents would probably give strength to the mistaken views. When a person is wounded in the leg, and a principal nerve cut across, the lower part of the limb, isolated from the brain, is