

so as to destroy its sensibility, while the action of the heart continued. Under these circumstances, he applied mechanical irritation, and also various chemical agents, to the ganglions and plexuses of the ganglionic nerves, and found that the heart continued to beat with the same regularity as before, and with the same frequency of pulsation. From these and other observations, the author concludes that the ganglionic system of nerves, with their plexuses and ganglions, performs the office of combining the influence of every part of the brain and spinal marrow, and of bestowing it on the muscles of involuntary motion, these muscles being subservient to those functions of life which require that combined influence; that the manner in which the influence of these organs affects the muscular fibre is not essentially different from that of other stimulants and sedatives; and that this influence is not an agent peculiar to the nervous system, but is capable of existing elsewhere, and is consequently not a vital power, properly so called; a conclusion which appears to him to be confirmed from the circumstance that galvanism is capable of performing all its functions. Hence he infers that the brain and spinal marrow, far from bestowing on the muscular fibre its peculiar power, only supplies an inanimate agent, which, like all other such agents, capable of affecting it, acts on it either as a stimulant or sedative, according to the degree in which it is applied, and is identical with the galvanic influence.

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February 14, 1833.

The Rev. WILLIAM BUCKLAND, D.D., Vice-President, in the Chair.

A paper was read, entitled, "On the Existence of four distinct Hearts, having regular Pulsations, connected with the Lymphatic System, in certain Amphibious Animals." By John Müller, M.D., Professor of Physiology in the University of Bonn. Communicated by Leonard Horner, Esq., F.R.S.

The author had long ago observed, that, in frogs, there exists, immediately under the skin, large spaces containing lymph, whence it can be readily collected by making incisions through the skin. These receptacles for lymph are larger in the frog than in the other amphibia: but all the animals of this class appear, from the observations of the author, to be also provided with remarkable pulsating organs, which propel the lymph in the lymphatic vessels, in the same way as the heart propels the blood circulating in the arterial system. In the frog, two of these lymphatic hearts are situated behind the joint of the hip, and immediately underneath the skin. Their contractions are performed with regularity, and may be seen through the skin; but they are not synchronous either with the motions of the heart, or with those of the lungs, and they continue after the removal of the heart, and even after the dismemberment of the animal. The pulsations of these two organs on the right and left side are not performed at the same time, but often alternate at irregular intervals.

The author proceeds to trace the connexions of these cavities with the lymphatic vessels in the neighbourhood, and with one another: and it appears from his researches, that the lymph of the hinder extremities, as well as that of the posterior part of the abdomen, is conveyed by means of these hearts into the trunk of the crural veins. He also gives a description of the posterior part of the venous system of the frog, noticing particularly the large transverse anastomosis between the sciatic and the crural veins, which joins the anterior median vein of the abdomen, and conducts the blood partly into the vena portæ, and partly into the renal veins.

Professor Müller has likewise discovered two anterior lymphatic hearts in the frog; a discovery to which he was led by some observations of Dr. Marshall Hall, who stated that he had seen in that animal an artery pulsate after the removal of the heart. These anterior lymphatic hearts lie on each side upon the great transverse process of the third vertebra, immediately under the posterior end of the scapula, and they are nearly as large as the posterior hearts. They receive the lymph of the anterior parts of the body, and probably also that of the intestinal canal, in order to transmit it into contiguous veins, which pour their contents into the jugular vein. The author has discovered similar organs in the toad, the salamander, and the green lizard; and is of opinion that they exist in all the amphibia.

The following announcement was made from the Chair:—

“His Royal Highness the President has received from Professor Gauss the abstract of a paper read by him at the meeting of the Royal Society at Göttingen, on the 15th of December last, entitled ‘*Intensitas vis magnetice terrestris ad mensuram absolutam revocata.*’ Mr. Gauss’s views possessing considerable interest, His Royal Highness is desirous that they should be made known to the Fellows of the Royal Society; but as the original paper will not be printed for many months, and the abstract which appeared in the *Göttingische gelehrte Anzeigen* is in a language not generally understood in this country, His Royal Highness has requested your Foreign Secretary to translate it; and I am commanded to desire your Secretary to read the same to the present meeting.

“In deviating thus far from the usual routine of the business of the Royal Society, His Royal Highness is actuated by a wish to promote the reciprocal and early communication of new and important discoveries and views in science, between our own and the other Societies of Europe, devoted, like this, to ‘*the improvement of natural knowledge.*’

“Communications of this nature, however, cannot of course be admitted into your Transactions; but the publication, from time to time, of your Proceedings, affords a happy means of giving them general circulation; and thus the rapid propagation of much valuable information will be effected, which otherwise, if not absolutely lost to us, would, at least, long remain unknown to the British scientific public.”