

The question then arises, what is the explanation of the indirect effect of these nerves on the heart through the peripheral arteries, as shewn in the experiments on the cord referred to above?

We must here remind the reader, that while the chief vaso-motor centre of the sympathetic is believed to be located in the medulla oblongata, it has been shewn by physiological experiments that there are also vaso-motor centres in the spinal cord.* To say that these spinal centres are irritated and excited as a consequence of section of the cord in their vicinity, is only to interpret the result of section, as Physiologists are accustomed to interpret the effects of traumatic injury to nerve tissue elsewhere, (see preceding pages.) Excitation of the vaso-motor spinal roots of the sympathetics, is naturally enough transferred, through the connecting nerves to the contiguous sympathetic ganglia placed at intervals in front of the vertebral column, and from these to the vaso-motor terminal nerves, dilating the arteries with a consequent fall in blood pressure as related by the experimenters.

The effects of section of the cord, here considered, must not be confounded with those of "pithing," in which the spinal cord is destroyed, and the vaso-motor centres of course are destroyed with it. [As we have called attention, elsewhere,† a careful reading of Dr. Burdon-Sanderson's account of the phenomena attending "pithing" will show that the inference commonly drawn from that operation is erroneous, in that, while it is assumed that the entire vascular system is dilated (from paralysis of the sympathetic) it is really the venous system only which is relaxed, into which the blood has been driven from the arteries, which contract till they are as empty as it is possible for them to become. Here vaso-motor dilating power is at an end, and the inherent contractile power of the muscular coat of the arteries being no longer restrained, asserts itself in the contraction of these tubes, just as it does after the general death of the body, when vaso-motor and all other nerve power is extinct. Section of the cord below the medulla, on the contrary, is attended by dilatation of the arteries, as we claim, from excitation of the contiguous spinal vaso-motor centres in the manner mentioned.

We now come to the application of the faradic

current to the distal portion of the divided cord, We have elsewhere* quoted Dr. C. B. Radcliffe, F.R.C.S., etc., to prove that a continuous current of electricity so paralyzes the spine of a rabbit, that "the part between the poles may be cut, pricked, torn," etc., without occasioning pain. Whether the current was passed up the spine or down the spine, the result was the same so far as *its paralyzing action* was concerned.† What Dr. Radcliffe states here of the galvanic or continuous current, is equally true of the faradic, since both produce anaesthesia of nerve tissue, and the difference between the two currents is mainly of *degree*.‡

Faradization then, we claim to be inimical to nerve function, and that, applied to the distal portion of the divided spine, it paralyzes the vaso-motor sympathetic nerves at their origin in the cord; puts an end to the dilating power of their terminal branches, and as a result the arteries contract (from the inherent contractile power of their muscular walls) blood pressure is consequently increased, and as is otherwise the case when previously abnormally dilated arteries are reduced, in calibre (as by digitalis) the heart's pulsations are increased in frequency and in force.

From the foregoing physiological facts, we think the conclusion is inevitable, that the so-called "accelerators" of the heart have no direct influence on that organ, and really affect it so indirectly as to be unworthy of their name: that as a special motor power of the heart, (which contains within itself the springs of its own action),§ they can be entirely dispensed with, since the functions they perform are simply the functions performed by the ordinary vaso-motor nerves everywhere throughout the body.

THE SO-CALLED "DEPRESSOR" NERVES.

According to Dr. Burdon-Sanderson, this nerve arises from two roots, one from the superior laryngeal (a sensory branch of the vagus) and the other which is less constant, from the trunk of the vagus itself. He says "it ends in the inferior cervical ganglion" of the sympathetic, but that from the ganglion its fibres may be traced to the connective tissue between the origin of the aorta and pulmonary artery," where it loses itself in the plexus of nerves" found there, which is no doubt the cardiac

* (Dr. Ott, Action of Medicine, p. 70.) † (Physiological Therapeutics.)

‡ Phys. Therapeutics. † (Lectures on Epilepsy, Paral. and Pain, pp. 64, 65). † Hand book, etc., p. 274. § Drs. Beard and Rockwell, (Med. & Surg. Elec., 2nd Ed., p. 299, etc.)