

as to the results here. Now the law of uniformity of cause and effect, demands that what is true of the relative state of the arteries and veins after section of the splanchnics, must be true also after section of the cervical sympathetic—and since the arteries are thus shown to be empty and the veins full in the former case, the same condition must be held to prevail also in the latter. It is worthy of note, in this connection, that both after section of the spinal cord, and after section of the splanchnics, blood pressure falls, and in both cases may be restored by faradization of the divided cord or nerve. It is evident from this, that the fall of blood pressure (as shown by the kymograph in the carotid) on section of the cord, is not to be regarded as an indication of arterial relaxation, as appears to have been done; because blood pressure fell also after section of the splanchnics, where we know positively that arterial dilation could not have taken place. It may be asked, how could faradization of the spinal cord or of the nerve, restore the pressure or tension in the arteries, if the heart and arterial system were already empty? Dr. Burdon Sanderson supplies the answer indirectly, in stating: "It is seen that after section of the cord the heart is flaccid and empty, and that its cavities fill and its action becomes vigorous, when the vascular contraction caused by excitation of the peripheral end [of the cut cord] forces the blood forward so as to fill the right auricle" (a). Now the only blood which could be "forced forward so as to fill the right auricle" is *venous* blood from the distended portal system. Thus it will be seen that all the facts fit, and as it were, dovetail into each other, in establishing that nervous paralysis and contraction of the arterial muscle go together the result being hypermeia, not of the arteries but of the veins. The explanation just quoted from the Hand-book, as to the forcing forward of the venous blood, as an effect of the faradic current, confirms the explanation made above, as to the dissipation of the venous hyperemia by the same current after section of the cervical sympathetic.

STATE OF THE ARTERIES IN DEATH.

Not only are the arteries invariably as empty as their physical structure will permit them to be, when their nerves are cut or paralyzed in the living body, but such is also their condition *in death* of the

body, when nerve force is extinct. This is a fact too well known to need any special proof. It is a fact, however, which ought to be explained by those who hold that in a condition of nerve paralysis the arteries are "dilated" and hyperemic.

THE OPERATION OF PITHING.

What has just been said of the contracted and empty state of the arteries is true also after the operation of "pithing" (in which the medulla and spinal cord are destroyed); as any one can easily satisfy himself, as I have done, by actual experiment. This is inadvertently proved to be the case by Dr. Burdon Sanderson in his account of an experiment designed to prove the contrary. Two frogs are taken. One is "pithed," in the other the nervous centres are uninjured. In both the heart is carefully exposed and the single ventricle slit open, so as to show the state of the great vessels. The experiment is intended to prove that in the pithed frog the arteries are "relaxed" and full of blood. On Dr. Burdon Sanderson's showing, the results are these: In the pithed frog, "although the heart is beating with perfect regularity and unaltered frequency, it is empty, and in consequence, instead of projecting from the opening in the anterior wall of the chest, it is withdrawn upwards and backwards towards the esophagus." The heart and its appendages "are alike deprived of blood"; but on opening "the rest of the visceral cavity, *the intestinal veins are distended.*" In these, "the whole mass of blood has come to rest, *out of reach of the influence of the heart.*" How significant is this! If the arteries were dilated, and consequently full of blood, this blood could not be said to be "out of reach of the influence of the heart." But this is not all. The Hand-book continues: "In the frog deprived of its central nervous system *only a few drops of blood escape*—the quantity, that is to say, previously contained in the heart and in the beginning of the arterial system. In the other, *bleeding is not only more abundant but continues for several minutes after the section.*" [Italics mine.]

Is it not evident that in the case of the pithed frog, the arterial system promptly emptied itself into the now "distended veins," and had "only a few drops of blood" left to drain away through the open ventricle (the frogs being both suspended), while in the case of the other frog, whose nervous

(a) Lec. Phys. p. 251.