

blood. On the contrary "the immediate consequences" of "a general contraction of the small arteries" is "to fill the venous system," and in a few minutes "the arteries are empty and the veins dilated," the animal being dead. This is precisely the condition which we have seen in a former page, to be the direct result of destruction of the nervous centres. It is a process which invariably prevails in the dying, and is complete in death. Thus according to Paul Bert quoted by Prof. Kuss, "death is always owing to asphyxia" (a).

Why has it been assumed by physiologists that in this rapid sinking into death, the nervous centres are undergoing an unusual excitation? Because as we have just seen, there is "a general contraction of the small arteries," and other spasms and contractions of the respiratory muscles fixing the chest and arresting respiration; and in accordance with the theory of the day, these spasms and contractions of the muscles, depend on active discharges of nerve force, stimulating the muscles to contract. How is this assumed extraordinary activity of the nerve centres to be accounted for in an animal actually dying? There is a "physiological law" which declares that the activity of an organ is directly dependent upon its receiving a due supply of arterialized blood (b) and Dr. W. B. Carpenter has said of venous blood, that "it exerts a depressing influence upon the nervous centres," from which they are at length "completely paralyzed." (c) One would have imagined that bad blood, deficient in oxygen and loaded with carbonic acid, would have been the very last thing which a physiologist would have chosen as a pabulum from which to generate an excess of nerve force! and doubtless the choice was embarrassing enough. But necessity compels. The exigency of the theory is inexorable. Muscular contraction without nervous stimulation is deemed impossible, and there being nothing else to fall back upon, it has been assumed that impure, non-arterialized blood plays the part of a stimulant to the nervous centres. Accordingly we find a recent and popular writer—Dr. J. Milner Fothergill—in his "Antagonism of Therapeutic Agents," declaring that "the more venous the blood the greater the activity of the respiratory centre. The effect of venous blood is to augment the natural explosive decomposition of

the nerve cells. . . . The effect of defective arterialization causes more rapid as well as deeper breathing; more perfect and extensive respiration is set up until properly oxygenated blood is procured." This author would almost lead one to believe that a kindness was done to the rabbit in having its vagi cut. He says, "When the vagi are cut, the respiration is modified; it becomes deeper and more prolonged, fuller and more complete." (d) But unfortunately this view of an apparently improved respiration is wholly delusive; for, as Dr. Burdon Sanderson tells us, "notwithstanding the vigor of the respiratory movements, the blood becomes more or less venous,"—the animal is dying, and does die, "commonly before the end of the first day" (e).

Let it be kept in view that the theory of the day explicitly teaches that "the muscles receive from the nervous system a preternatural stimulus to action" (f) and that spasm and convulsion "are dependent upon excessive activity of the spinal centres:" (g) and we shall see presently to what apparent absurdity this doctrine has led. In one of Kussmaul and Tenner's experiments, the carotid arteries are ligatured with the effect of inducing "immediate loss of consciousness and general and violent convulsions," which are promptly recovered from, and nervous control over the muscles restored, as soon as the ligatures are united and blood is admitted to the brain. Dr. M. Foster's view of this experiment is, that here "the nervous centres being no longer furnished with fresh blood, become rapidly asphyxiated through lack of oxygen." And yet strangely enough he holds that in this almost fatal condition of "rapid asphyxiation," the nervous centres are undergoing stimulation! for he adds: "similar anemic" convulsions are seen after sudden and large loss of blood from the body at large; the medulla being stimulated by the lack of arterial blood." (h) Surely such a view as this may be gravely challenged, even when put forward on high physiological authority! Dr. M. Foster remarks in another page, in his chapter on "Death," that "blood is not only useless but injurious unless it be duly oxygenated" (i). And again he says

(a) Phys., p. 330.

(b) Dr. C. B. Radcliffe. (c) Hum. Phys., p. 537.

(d) P. 88. (e) Hand-book, p. 317.

(f) Dr. Pereira. Vol. 2, p. 541.

(g) Dr. W. B. Carpenter, *Ib.*, p. 84.

(h) Phys., p. 441. (i) P. 833.