

I then laid open the thorax and abdomen, leaving the muscles of the throat untouched, and found the pulsations of the heart weak but regular. The circulation was maintained, and during all this period the animal remained perfectly insensible.

But in 25 minutes more, the heart began to beat with greater force and frequency, a partial respiration took place and in a few minutes another, and the frog moved its head and fore-legs slightly. It was now sensible to irritation. The action of the heart increased, and the current of blood could be seen distinctly passing along the arches of the aorta. The lungs were distended with air, and red florid blood circulated in their vessels. Pulsations of the heart 38 per minute.

The frog became so strong that it turned upon its face, and could crawl along the table. It remained for four hours in this vigorous condition, the heart acting with energy, and after the pulsations had fallen to 10 or 12 per minute, the frog shewed every symptom of sensation on being touched or irritated.

Similar phenomena were witnessed by Dr. Cartwright in his experiments on alligators.

“When an alligator,” says he “has been killed to all appearance in half an hour by tying the trachea, and freely dissected, it gives no signs of pain whatever, but on inflating the lungs it comes to life, and then it responds and shews pain and intelligence, when cut or irritated in any part.”

These experiments show that the time required to produce asphyxia in an animal varies according to its physiological condition, and the rapidity with which the function of respiration is affected, and that the power which a cold blooded animal possesses of resisting the deprivation of oxygen depends on the state of its system at the moment. For during the warmest period of the season, when the functions of the body are carried on with the greatest energy, if respiration be simultaneously arrested in the skin and the lungs of a cold blooded animal, it will die almost as soon as a warm blooded one; so powerful is the effect, that it seems to act almost like concussion of the brain. Insensibility is produced and at the same time, the action of the heart is depressed.

What is the immediate cause of the insensibility that is thus produced? It does not arise from the deficient supply of blood to the heart and the brain, for the heart continues to beat, and dark venous blood to circulate through the arterial system long after the animal has become insensible; and if the non aerated blood had been finally arrested in the capillaries of the lungs or the skin,—the seat of the respiratory process in cold blooded animals—or so arrested that it could not be sent forward to the heart in sufficient quantity to maintain the circulation, these phenomena could not have been witnessed. But we have seen from experiment VI that at the time asphyxia was induced, the heart continued to beat at 40 pulsations per minute, and in another experiment the dark venous blood passed along the arch of the aorta when the pulsations of the heart were only 30 per minute, the animal remaining in a state of deep insensibility. Whereas, if an animal die from another cause—when the function of respiration is not affected, the pulsations of the heart may be reduced to 10 or 12 per minute, and yet we have distinct evidence of sensation on irritation applied to the integuments. From these facts, it appears, that it is not from the deficient action of