

of the ventricle precedes that of the auricles, but its action may frequently be renewed by opening the pericardium. If the thorax be opened shortly before the action of the ventricle has ceased, as is generally the case, the contractions of the ventricle appear to be weak and irregular and at length gradually cease. It no longer receives the blood from the auricles and propels it forwards. But the auricles continue to contract for a considerable time after the ventricle has become quiescent.

The question then that we have to determine is, what is the immediate cause of death in asphyxia? Not but that asphyxia depends on the non supply of oxygen to the blood, but how does this cause produce its specific effects on the system—first that of insensibility, and then the cessation of the circulation of the blood?

July 15th. Took a frog, and placed it in a wide-mouthed phial full of water and inverted this amongst water in another vessel. The frog was thus completely surrounded by water, and all respiration by the lungs suspended. It appeared to suffer little inconvenience at first, but in about ten minutes became restless and agitated, and in twenty minutes more, had fallen into a state of stupor and was perfectly quiescent.

After the frog had remained nearly two hours in the water, I removed it, and placed it on the table, and it appeared to be reduced to a state of perfect insensibility. No irritation could arouse it, neither pinching, nor pricking, &c, had the slightest effect in exciting a muscular movement. Respiration was suspended and life seemed extinct, except that the heart continued to beat at twenty (20) pulsations per minute.

I blew a little air into its lungs, and renewed the artificial respiration at intervals, and the action of the heart gradually increased, and rose to 30 and afterwards to 36 pulsations per minute. A natural respiration now took place, and after a little another slight respiration was observed. During all this period, the frog remained in a state of perfect insensibility. No irritation could excite a muscular movement of its limbs or any part of its body; natural respirations increased in frequency, and the heart still continued to beat at 42 pulsations per minute, and remained so for nearly half an hour. The respirations gradually became stronger and more continued, and then the frog began to open its eyes and showed the first symptoms of returning sensibility. On irritating its foot it slightly moved the integuments of its head, but did not as yet move any of its limbs. Sensibility gradually increased, and in a short time the frog began to move with vigour, and completely recovered.

A phenomenon worthy of observation in this case was, that though the heart continued long to beat at 42 pulsations per minute, and the circulation to be thus carried on with considerable vigour, it was not till the respirations had become stronger, and more frequent, and consequently the blood to be more fully arterialised, that the sensibility returned.

*August 1st. Temperature 84° Fahrenheit.*

Placed a frog in a small glass phial completely filled with water, and secured it in this position from every access of atmospheric air, so that respiration by the lungs was entirely suspended.