

IV. *Additional proofs of animal heat being influenced by the nerves.* By Sir EVERARD HOME, Bart. V. P. R. S.

Read November 16, 1825.

THE conclusions drawn from my experiment upon the deer's horns, published in the last volume of the Philosophical Transactions, are so important, that I felt it a duty to repeat the experiment in the ensuing season.

This I have done, and have the satisfaction to find that the result agrees in every respect with that drawn from the first experiment.

For the present experiment, I was furnished with a buck of full head, seven years old, and in good condition; the former not having suffered from what was done in any respect whatever.

As several disadvantages had arisen in the former experiment from the horns having been bored; they were now prevented by applying a cincture of knitted worsted round that part of the palm, the heat of which was to be ascertained, three inches broad; and the bulb of the thermometer was received between this and the velvet of the horn. As soon as the temperature was taken, the cincture was removed. All liability to external injury was precluded, by confining the animal in a stable.

A circumstance favourable to put the result of this experiment to the severest test was, the heat of the atmosphere being very different from that in the former season; during

the time of the experiment in 1824, it was 66°, in 1825, 84°, a difference of 18°.

This experiment was begun on the 12th of July, 1825, at three o'clock. The temperature of the atmosphere was 84°, that of both horns exactly 98½°. Immediately after Mr. MAYO had divided the nerves, the heat of that horn was diminished to 93¼°, and the heat of the other increased to 99°.

The following register, showing the changes that took place in the temperature of the horns and atmosphere, was regularly filled up every day at three o'clock.

Day of July.	Heat of Atm.	Heat of Horn operated on.	Heat of the other Horn.
12th	84°	93¼°	99°
13th	84	93	98
14th	84	93	100
15th	85	96	99
16th	86	97	99¾
17th	86	97	99
18th	86	90¾	98
19th	86	97	99
20th	85	97	99
21st	75	95	97
22d	76	93	93
23d	74	93	93

After the two horns had become of the same temperature the buck was allowed to join the herd. On the 28th of July it was killed for the use of the table, which gave me an opportunity after death of examining the parts that had been operated on. The horns had not shed their velvet, were exactly of the same size, and equal in solidity.

The parts where the nerves had been divided were carefully dissected and examined by Mr. MAYO, Mr. CÆSAR HAWKINS, and myself. The two cut ends of the nerves had receded from one another, and the interval between them was occupied by a dense newly-formed substance, which had become a firm connecting medium, explaining satisfactorily the restoration that had taken place in their functions. In the former experiment this connecting medium was less dense, and left a doubt upon my mind, which is now completely removed.

While engaged in this investigation I have had an opportunity, in the course of my professional duty as Surgeon to Chelsea Hospital, to ascertain the effect of tying the trunk of the artery that supplies the human thigh and leg on one side, upon the temperature of the limb, compared with that of the other, which remained in a natural state; and contrasting this with the effect that has been stated to take place when the nerve of one horn is divided.

As I intend to lay before the Society the detail of the treatment of this case, of an aneurism in the external iliac artery of the right side, which I trust will tend to the advancement of the science of Surgery on a future occasion, I shall confine myself at present to the effect produced upon the temperature of the limb, when the femoral artery is obliterated immediately below Popart's ligament.

Before the artery was included in a ligature, the temperature of the foot, ascertained by a thermometer, was 93°; that of the left, which was in a state of perfect health, 84°. In ten minutes after the operation the heat of the foot fell to 87°; in 30 minutes to 85, while the left foot remained at 84°.

In eight hours the heat of the left foot rose to  $94^{\circ}$ , probably from the increased quantity of blood circulating through its arterial branches, since next day the temperature fell to  $88^{\circ}$ , at which it continued stationary for four days; the foot of the aneurismal side in 24 hours fell to  $84^{\circ}$ , but on the following day rose to  $85^{\circ}$ , and continued at or above that temperature till the ligature came away.

Nothing can have been more satisfactorily proved than that the heat of the parts of the body is diminished by dividing the nerves going to them; while, on the other hand, obstructing the arterial trunk of the thigh, even before it sends off the great muscular branch, does not diminish the heat in the smallest degree below the natural standard.

I have had many opportunities of ascertaining the temperature of the foot after the femoral artery has been tied in the operation for the popliteal aneurism, and found it commonly one degree below that of the other foot, but the heat of the two feet had never been ascertained before the operation, so that I was most probably deceived in the conclusion I had drawn; and in reality, the heat of the other foot had been raised above the standard, instead of having been depressed below it.