

oscillations occurred irregularly, due to noises or other external stimuli and movements of the sleeper. Mosso's experiments are referred to by which it was conclusively proved that the limbs enlarged during sleep, due to vascular dilatation; he showed also that the volume of the brain diminished during sleep, and that any unusual mental activity increased the brain volume and lessened that of the limbs, and other observers have found a definite relationship existing between the circulation in the brain and general arterial pressure. There being no vaso-motor fibres in the brain vessels, the circulation there is regulated passively by variations in arterial pressure on the remainder of the body. The skin is flushed, and of a higher temperature during sleep, and there is a general fall of blood pressure.

Assuming that the volume of the brain circulation stands in reciprocal relationship to the volume of the arm, the changes in the amount of blood circulating through the brain during sleep may be stated as follows: At the commencement of the period preparatory to sleep the blood flow through the brain begins to diminish in quantity, owing to the fall in arterial pressure, and for a period of an hour or more after sleep has appeared the blood flow grows less and less, following the continued diminution in arterial pressure. After reaching its minimum, the volume of the brain circulation remains practically constant, with the exception of the temporary variations which have been referred to previously, for one or two hours, or possibly longer, if the period of sleep lasts for a greater time than was obtained in these experiments. The blood flow through the brain begins then to increase gradually, following the rise in blood pressure produced by the slow constriction of the skin vessels, and this increase becomes much more rapid for the short period of one-half to three-quarters of an hour preceding spontaneous awaking. At the time of awaking, therefore, the volume of the blood flowing through the brain is approximately the same as at the time sleep appeared.

It is considered probable that the internal organs do not share in this dilatation in the skin, but that the blood diminishes in them as it does in the brain. The rhythmic oscillations in the curve referred to are supposed to be due to a rhythmic increase and relaxation of tone in that part of the vaso constrictor centre controlling the vessels of the skin changes which are characteristic of the vaso-motor centre.

In regard to the cause of sleep the writer does not yet endorse the recent views of Cajal that the neuroglia cells expand between the communicating processes of the cell units acting as insulators or Duval's theory that conductivity is broken by the withdrawal of the cell processes from each