

with a current of the same strength brought a good response. At this time the animal was breathing well and there were none of the symptoms of asphyxia which appeared later.

*Results.* — 1. The behavior of an animal in response to sensory stimulation is notably altered after the subcutaneous injection of magnesium salts in large amounts. Motor response may even entirely disappear but a disappearance of sensitiveness is not concomitant with motor paralysis. But if previous to the administration of the salt in frog, the blood vessels to a hind limb be ligated, the muscles of such a limb show good response to stimulation of the skin of the fore limbs.

2. A rabbit poisoned with magnesium sulphate shows a loss of muscular response to indirect stimulation, while at this time the muscular response to direct stimulation is good. At this stage the reflex mechanism is still capable of functioning as shown by the contraction of trunk muscles on stimulating the central end of the sciatic nerve. The more peripheral muscles seem first to be paralyzed. The muscles of respiration appear to be the last to become paralyzed.

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**The effects of direct application of magnesium salts : A. To motor and sensory nerves ; B. To cardio-inhibitory nerves.**

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A. The sciatic nerves in both legs of frogs were exposed and three pairs of stationary electrodes placed beneath each. The wiring was such that an induced current could be switched to any of the six pairs of electrodes at will. After recording the control, direct and reflex response of the gastrocnemius muscles, the solution to be tested was applied to the nerve trunk at the site of one of the middle pairs of electrodes. Stimulation of the nerves was continued and the result recorded. After a time the solution on the nerve (or on both nerves, when two substances were being tested at the same time) was removed and return of function

recorded. Changes in excitability were observed by stimulating with the middle pairs of electrodes.

B. The vagus nerves of spreading vipers were isolated and stationary electrodes placed beneath each nerve. The heart (apex) was connected with a lever by means of a thread and its action recorded. After establishing the control responses to vagal stimulation by leading a current through each pair of electrodes consecutively, a saturated solution of magnesium sulphate, magnesium chloride, sodium sulphate, sodium chloride, calcium chloride or cane sugar was applied to the nerves below the electrodes and the nerves again stimulated, the nerves being washed with 0.75 per cent. sodium chloride and normal response established between each application.

*Results.* — 1. The direct application of strong solutions of magnesium sulphate to a mixed nerve (sciatic) is, as a rule, soon followed by contraction of the muscles supplied by the nerve; and often by contraction of the muscles of the opposite leg, as well as other muscles of the body (reflex contraction).

2. Stimulation of the nerve above and below the point to which the salt is applied gives results indicating the onset of afferent before efferent block.

3. If the salt be removed soon enough the block may disappear.

4. Other substances, *e. g.*, sodium chloride, sodium sulphate, magnesium chloride, calcium chloride, or cane sugar, give similar results.

5. In common with all the other above mentioned substances tried the application directly to the vagus nerve of a strong solution of magnesium sulphate or magnesium chloride causes a loss in conductivity in the cardiac-inhibitory fibers; and if the solution be removed soon enough conductivity may be restored.

We do not consider that any specific action of strong magnesium salts solutions on the conductivity of nerve fibers has been made out. The blocking effect does not appear to differ from that produced by any markedly hypertonic solution.