

are capable of being deposited in the depot fats of ruminants as in the case of non-ruminants provided they are not first subjected to the action of the rumen micro-organisms.

Thus the hypothesis mentioned here, that the differences between the depot fats of ruminants and non-ruminants arise from the hydrogenation of the unsaturated dietary fats in the rumen, receives further support.

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Photomotor Reflex as an Indicator of Consciousness during Curarization

WHEN a relaxant is used in conjunction with a general anaesthetic, a new problem arises in assessment of the depth of anaesthesia: the reflexes which normally indicate returning consciousness and awareness of pain cannot appear if the patient is under the influence of a relaxant. Thus, if only reflexes involving voluntary muscle are used, it is possible, in the presence of a relaxant, for anaesthesia to lighten so that surgery is performed on a conscious paralysed patient without surgeon or anaesthetist being aware of the situation. This has been recorded more than once in human medicine, the patient having described the situation after the operation¹. The same situation can occur in operations on animals when an anaesthetic is used in conjunction with a relaxant; but in this case the patient cannot afterwards direct attention to the mistake. Such circumstances produce problems with humanitarian and legal aspects for the veterinarian, as Finn² has pointed out; they also complicate the interpretation of the pain clause for research workers holding a vivisection licence.

The electroencephalograph can be used to assess depth of anaesthesia in a curarized man or animal, but it is not always available, and needs some skill in interpretation. Experiments have therefore been carried out to discover a simple method of assessing depth of consciousness in curarized dogs, the electroencephalograph being used as a criterion of the activity of the brain. Pentobarbitone sodium, thiopentone sodium and ether were used as anaesthetics, and succinylcholine chloride as the relaxant.

It was found that the photomotor reflex (change in size of pupil of eye with sudden change in light intensity), unlike the other reflexes commonly used for testing anaesthesia, gave a reliable indication of returning consciousness in the presence of a relaxant. It became positive as the dog passed from stage III (surgical anaesthesia) to stage II (excitement). Pre-medication with atropine did not invalidate the reflex, provided that the dose of atropine did not exceed 0.032 mgm./kgm. body-weight. It seems likely that this reflex would also be useful in human

patients in similar circumstances. The work will be described in more detail elsewhere.

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Spiral Nerve-endings (Proprioceptors) in the Human Vocal Muscle

THE problem of the proprioceptive innervation of the human vocal muscle is still controversial¹. The presence of a proprioceptive mechanism controlling the fine adjustments of the vocal cords has been postulated by some authors; it has been rejected on theoretical grounds by others. Paulsen² assumes that the tension of the vocal muscle would have central control alone. A peripheral proprioceptive mechanism would be rather a hindrance for normal phonation. The same was said to be true of the extrinsic eye muscles, in which nevertheless proprioceptors have been demonstrated within the past ten years histologically as well as by electrical records³⁻⁵.

To clear up the question, we have cut the vocal muscle of men who had shown no evidence of neurological disease during life, in longitudinal frozen sections of 40–60 μ thickness. With a modification of the silver staining Bielschowsky-Gros method, we succeeded in showing spiral nerve-endings in this muscle, which may be interpreted as mechanoreceptors responding to stretch or shortening of the fibres (Fig. 1).

These spiral structures have been found to form a group of 3–5 nerve-endings occupying a small place within the motor innervation zone⁶ near the free inner board of the muscle at the level of the vocal

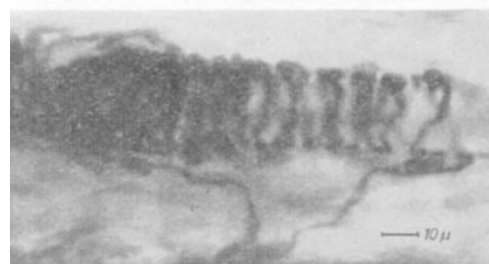
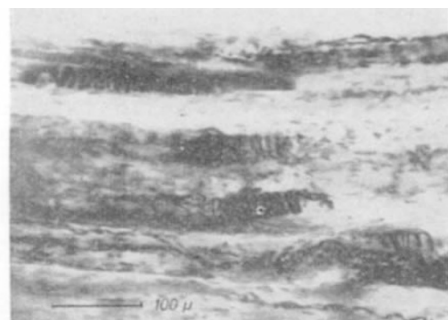


Fig. 1. Spiral nerve-endings in the human vocal muscle; silver staining. Top: Group of receptors in the small diameter muscle fibre area (inner board) of the muscle. Bottom: One receptor with higher magnification; double spiral turns in the left part around two small muscle fibres