

We found that isoprenaline (25 μg) increased the mucous flow (from 13 to 23 mm/min) and the ciliary rate (from 960 to 1,120 beats/min). Maximum responses were observed at 10 min. Atropine (0.25 μg) decreased the mucous flow (13 to 7 mm/min) and the ciliary activity (860 to 635 beats/min); maximum effects were seen at 30 min. Saline (0.9%) alone had little effect on mucous flow (14.3 to 12.4 mm/min) or ciliary rate (802 to 793 beats/min). Disodium cromoglycate (500 μg) was similarly innocuous (mucous flow 12.1 to 10.4 mm/min, ciliary rate 836 to 781 beats/min, $P > 0.05$). Atropine had similar effects in the standard method of frog's oesophagus *in vitro*. Isoprenaline, however, had no action in this preparation in concentrations up to 10^{-4} g/ml.

The increase in mucous flow rate and ciliary activity produced by isoprenaline may contribute to its beneficial properties in that in addition to its bronchodilator action, it may increase the rate of lung clearance of mucus.

We thank Professor Tore Dalhamn for discussions on the various technical aspects involved in the method.

REFERENCE

DALHAMN, T. (1960). The determination *in vivo* of the rate of ciliary beat in the trachea. *Acta physiol. scand.*, **49**, 242.

A simply constructed, low-cost mechano-electrical transducer

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A transducer is described which has the advantages of thermal stability and low cost not found with semiconductor type strain gauges. The transducer has been

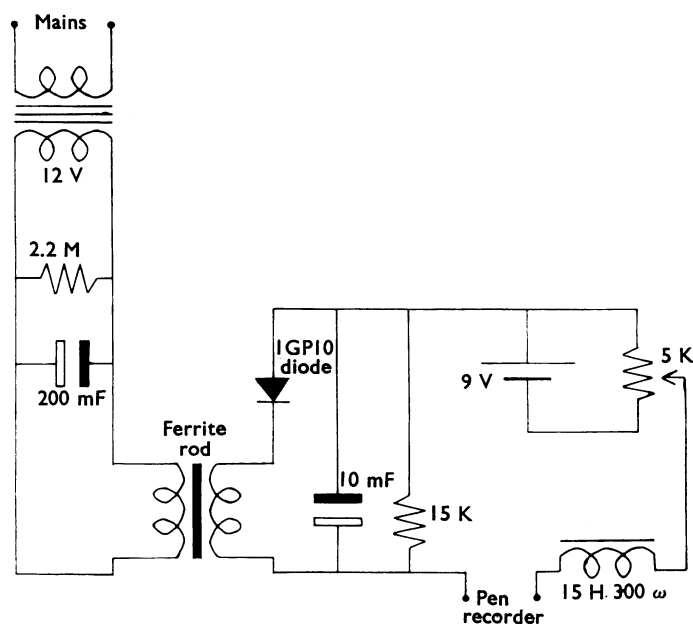


FIG. 1. Electrical circuit.

used with a microbath (Gaddum, 1965) to bioassay acetylcholine using leech dorsal muscle strips.

The transducer is constructed from readily available components at an inclusive cost of £4. Figure 1 shows the electrical circuit, and Fig. 2 the mechanical arrangement. It consists of a transistor transformer (Radiospares T/T7 output), from which a ferrite rod (R.T.S. Electronic Components, Cambridge) hangs freely from a simple isotonic lever. Because of this method of suspension no bearings are required.

The response to movement is curvilinear and a calibration graph is required of movements greater than 2.5 mm. A linear calibration was obtained for a range of 2.5 mm; this gave a full range voltage difference of 180 mV and a pen movement of 12 cm.

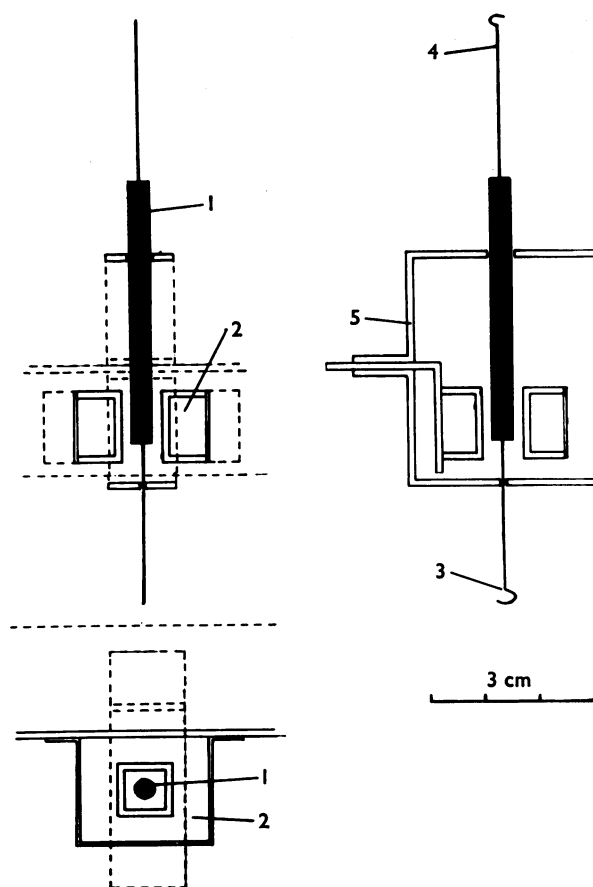


FIG. 2. Mechanical arrangement. 1, Ferrite rod; 2, Transformer cell; 3, Lower copper hook to which the muscle is tied; 4, Upper copper hook which is tied to a 'Palmer Simple Lever' by means of a thread; 5, Supporting frame of aluminium angle.

REFERENCE

GADDUM, J. H. (1965). An improved microbath. *Br. J. Pharmac. Chemother.*, **23**, 613-619.