COTTRELL, G. A. (1967). Occurrence of dopamine and noradrenaline in the nervous tissue of some invertebrate species. *Br. J. Pharmac. Chemother.*, **29**, 63–69.

GRAY, E. G. (1970). The fine structure of the vertical lobe of Octopus. *Phil. Trans. B*, in the Press.

LAVERTY, R. & SHARMAN, D. F. (1965). The estimation of small quantities of 3,4-dihydroxyphenylethylamine in tissues. *Br. J. Pharmac. Chemother.*, **24**, 538–548.

VOGT, M. (1954). The concentration of sympathin in different parts of the central nervous system under normal conditions and after the administration of drugs. *J. Physiol., Lond.*, **123**, 451–481.

The peripheral parasympathetic innervation of the cat lacrimal gland

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The lacrimal nerve, a branch of the trigeminal, is mainly a sensory nerve but it also conveys secretory fibres to the lacrimal gland (Demtschenko, 1872; Tepliachine, 1894). There is little doubt that these cholinergic fibres (Elsby & Wilson, 1967) are parasympathetic (Botelho, Hisada & Fuenmayor, 1966). They are believed to leave the skull in the Vidian nerve and relay in the sphenopalatine ganglion, from which they enter the infraorbital nerve, a continuation of the maxillary, to be distributed to the lacrimal gland by means of the lacrimal or zygomatic nerves (Jendrassik, 1894; Golding-Wood, 1964). This hypothesis has been examined in the anaesthetized cat.

The Vidian nerve was exposed by resection of the zygomatic arch, the ramus of the mandible and part of the infra-orbital region of the malar bone. The sphenopalatine ganglion and the Vidian nerve were located underneath the most medial aspect of the globe, lying on the muscles immediately above the hard palate. Supramaximal stimulation of the intact Vidian nerve produced an ipsilateral secretion which was collected from the superior conjunctival fornix by sheathed filter paper strips. This secretion was not abolished by section of the infra-orbital nerve. The secretions produced at different frequencies of stimulation of the Vidian nerve were greater than those obtained by stimulating the cut peripheral end of the lacrimal nerve; moreover, stimulation of the intact Vidian nerve still produced a secretion after lacrimal nerve section. The remaining secretion did not come from the lacrimal gland, for it was still obtained after removal of this gland. It was, however, abolished by atropine. In other experiments, the cut central end of the Vidian nerve was stimulated with the nictitating membrane clipped to occlude the ducts of the nictitating membrane gland and the infra-orbital nerve sectioned. In these conditions stimulation before and after removal of the lacrimal gland showed that the secretion originated entirely from the lacrimal gland.

Although lacrimal secretion produced by Vidian nerve stimulation could be due to activation of sensory or secretory fibres, the present investigations in the cat do not support the hypothesis that secretory fibres pass in the infra-orbital nerve to reach the lacrimal nerve. It is probable that the secretory fibres enter the lacrimal nerve proximal to the infra-orbital nerve. Investigations are in progress to determine the site of transfer.

REFERENCES

BOTELHO, STELLA Y., HISADA, M. & FUENMAYOR, N. (1966). Functional innervation of the lacrimal gland in the cat. *Archs Ophthal., N.Y.*, **76**, 581–588.

DEMTSCHENKO, J. (1872). Zur Innervation der Thränendrüse. *Pflügers Arch. ges. Physiol.*, **6**, 191–200.

ELSBY, J. M. & WILSON, H. (1967). Lacrimal secretion in the cat. *Br. J. Pharmac. Chemother.*, **29**, 1–7.

GOLDING-WOOD, P. H. (1964). The ocular effects of autonomic surgery. *Proc. R. Soc. Med.*, **57**, 494–497.

JENDRASSIK, E. (1894). Sur le role du nerf facial dans la sécrétion des larmes. *Rev. neurol.*, **7**, 186–192.

TEPLIACHINE, A. (1894). Recherches sur les nerfs sécrétoires de la glande lacrymale. *Archs Ophtal., Paris*, **14**, 401–413.

Two simple, relatively inexpensive, devices to measure the locomotor activity of anaesthetized or unanaesthetized animals

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In the course of some investigations into the convulsant activity of polyhydroxy phenols it became necessary to be able to measure quantitatively the locomotor activity produced by these chemicals. A system had to be devised which would

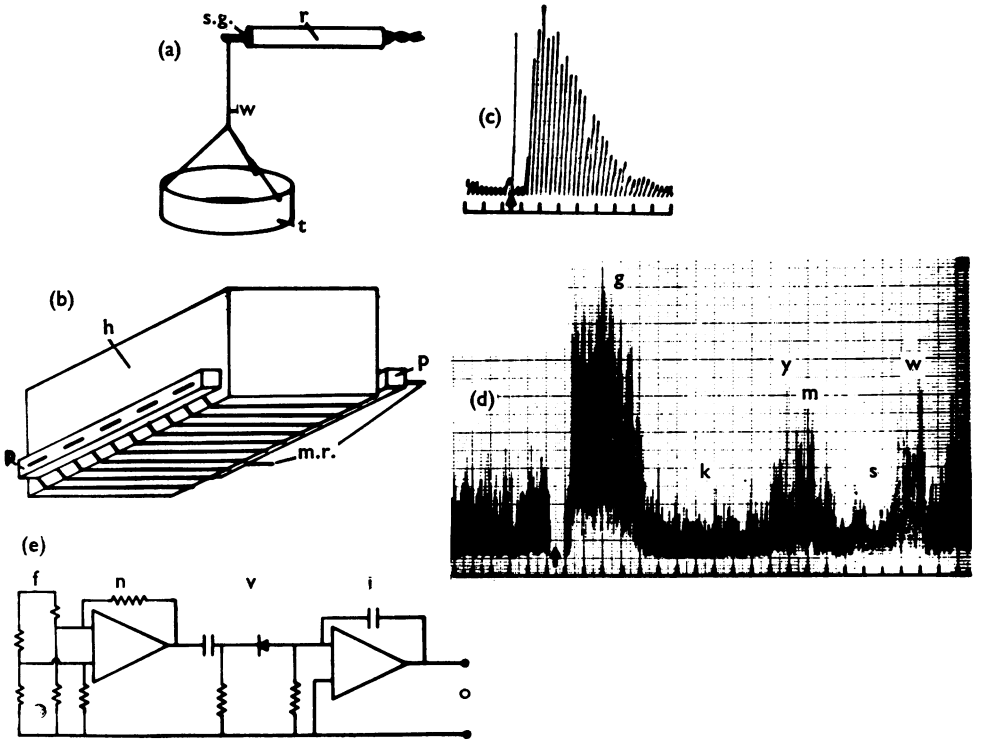

FIG. 1. (a), Diagram of the activity meter for anaesthetized animals. The plastic container *t*, suspended by a stiff wire *w* from the silicon strain gauge *s.g.* mounted on a beam attached to rod *r* which is held firmly in a clamp. (b), Apparatus for unanaesthetized animal showing the cage *h* supported on the mercury in rubber strain gauge *m.r.* which is held between two Perspex bars *p*. (c), Typical record of the convulsant effect of catechol (200 mg/kg) injected intraperitoneally into an anaesthetized mouse (at arrow). Time scale shows 2 min intervals; the integration period was 30 s. (d), Record from an unanaesthetized mouse before and after an intraperitoneal injection of catechol (60 mg/kg) at the arrow, showing the convulsion *g*, the period of post-ictal depression *k* and the activity produced by the animal washing itself *y*, sitting still *s* or moving around the cage *m*. The time scale shows 1 min intervals; the integration period was 3 s. (e), Circuit diagram of the apparatus, *f*, bridge; *n*, amplifier; *v*, AC coupling and half-wave rectification; *i*, integrator and *o*, output.