

makes it possible to demonstrate the three units in rapid succession. One reversing switch serves to change the direction of the current in any unit. An inclined plane mirror clamped above the apparatus makes the effect visible to a large class.

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AN INEXPENSIVE APPARATUS FOR THE MEASUREMENT OF BODILY ACTIVITY

It is at times important to obtain objective records of the bodily activity of animals without great expense and yet by means of a sensitive instrument. The following apparatus has been used successfully with young puppies and may be adapted to larger or smaller animals.

A small light aluminum baking pan 11" × 7" × 1½" (see a in Fig. 1) was suspended within a packing box

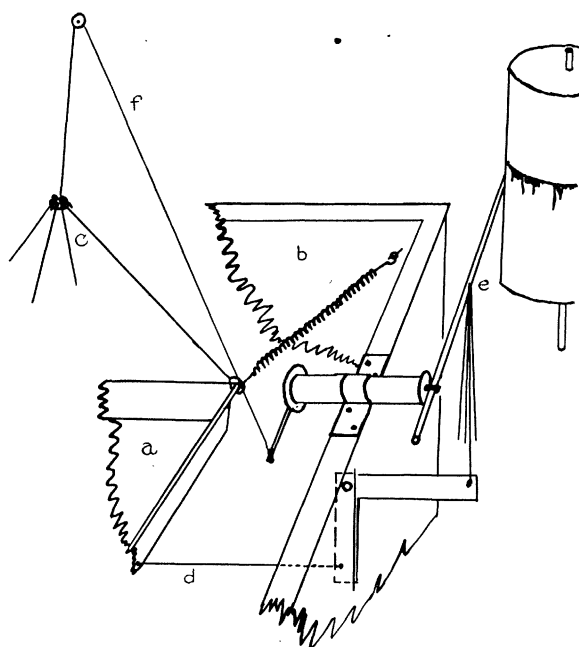


FIG. 1. Detail showing method of wiring used in apparatus for measurement of bodily activity: (a) aluminum pan; (b) packing box; (c) wire rods from corners of pan; (d) thread from side of pan to lever; (e) writing arm with threads attached; (f) thread from upright wires, leading to writing arm.

(b) (approximately 2 feet long, 16 inches wide and 1 foot deep) by means of small springs, one attached at each corner of the tray, and to eyes screwed in the corners of the box. These eyes were so arranged that they could be adjusted to various heights, depending on the weight of the animal. Four light wire rods (c)

projected from each corner of the tray to meet above its center.

In order to secure a single record from all movements of the tray, heavy threads (d) were attached to it, one on each side. By means of pulleys these threads converged at a series of levers amplified 3/2, and from the levers threads were connected to a writing arm (e) bolted to a bicycle bearing.

A thread attached to the upright wires from the corners of the tray, which converged above it, was arranged by pulleys in such a way (f) as to pull downward on a lever attached to the bicycle bearing opposite to the writing arm. This lever was bolted so as to make it adjustable to the weight of the animal. Thus, with the tray under slight tension on all sides and with respect to gravity, movement in any direction resulted in a downward pull of the writing arm.

If the animal studied is very active, it may be confined within a ventilated box, which may be placed in the tray, or the box itself may be wired in the way described.

The apparatus has proved sufficiently sensitive in the case of puppies to record practically all movements of skeletal musculature.

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A SENSITIVE A-C VACUUM TUBE RELAY

A VACUUM tube relay possesses numerous advantages in the temperature control of laboratory apparatus which outweigh the slight increase in the complexity of the system. The reduction of the current which passes through the mercury regulator from ten or a hundred milliamperes to the few hundredths of a milli-ampere required by the vacuum tube practically eliminates all sparking at the mercury contact and makes the presence of moderate amounts of dirt or oxides in the mercury surface a matter of no consequence. This results in a twofold advantage: first, special precautions as to purity of the mercury are unnecessary, and second, the regulator will in general give trouble-free service for longer periods of time.

A vacuum tube relay circuit is described by Rosenbohm¹ requiring a storage battery for the vacuum tube filament current supply and dry batteries for plate and grid voltages. Korpiun and Geldbach² show a circuit for operating a similar device with batteries or 220 volt alternating current supply, using two triodes. Both of these systems have certain disadvantages, the first requires a relatively large investment in batteries

¹ E. Rosenbohm, *Proc. Acad. Sci. Amsterdam*, 35: 876, 1932.

² J. Korpiun and Alfred Geldbach, *Z. Electrochem.*, 39: 755, 1933.