

ment were in some cases a little less complete than those which followed the use of formaldehyde or acetic acid dust, but germination of seeds was usually markedly improved, by the elimination of much pre-germination damping-off, and post-germination damping-off was on the whole very well controlled by 200 to 250 cc of vinegar per square foot. The quantity of vinegar necessary for satisfactory control of these diseases was apparently affected by the degree of infestation of the soil by the fungi, naturally contaminated soil being a less severe test than is soil autoclaved and artificially inoculated.

One-half pint (about 237 cc) of vinegar per square foot of soil, 3 inches deep, was usually enough for satisfactory, sometimes complete protection, with the number of living plants often increased many fold. Seedlings were weighed at that stage of growth at which they are usually transplanted for the first time, and this quantity of vinegar in the soils used had no retarding effect on growth of seedlings of *Calendula officinalis*, *Dianthus arenarius*, *Centaurea Cyanus*, *Lupinus polyphyllus*, *Iberis umbellata*, *Cheiranthus Allioni*, *Verbena hortensis*, *Dimorphotheca aurantiaca*, *Mesembryanthemum criniflorum*, China aster, beet, cabbage, lettuce and tomato.

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A METHOD FOR THE MEASUREMENT OF ACTIVITY OF SMALL ANIMALS

WHILE the running wheel has proved satisfactory for the study of the quantitative aspects of the activity of rats, the usual method of recording activity of other small animals by a vertically moving kymograph lever connected with the activity cage has not permitted adequate quantitative description. The apparatus described combines the method used by Skinner¹ in obtaining a distance-time graph of the activity of a rat in a running wheel and that of Szymanski,² which employs a cage suspended by a spring.

A cage (A) 1 ft. square on the bottom constructed of $\frac{1}{8}$ " wire mesh is suspended by a spring (S) of the type used for small bird cages. The arm of a physiological work adder (W) (Harvard Apparatus Co., Boston) is connected by a string with the center of the cage bottom, so that any movement of the cage will cause a turning of the ratchet wheel of the adder. Rotation of the adder winds a string connected with a reducing gear (G), which in turn causes an upward movement of a pen (P) recording on a kymograph drum. (K) (A pulley wheel of $1\frac{1}{4}$ " diameter on a $\frac{1}{4}$ " axle served satisfactorily as a reducing gear.)

¹ *J. Gen. Psychol.*, 9: 3-24, 1933.

² *Pflüger's Arch.*, 171: 363-373, 1918.

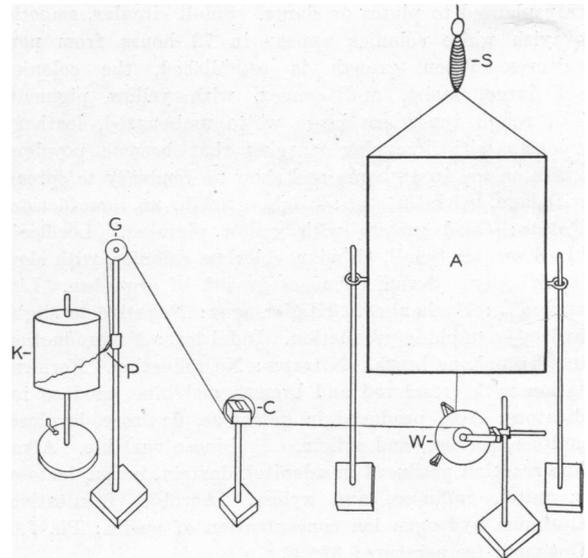


Fig. 1

This type of record differs from the usual one, which records each movement as a vertical rise and fall in that the graph rises during activity and moves horizontally during rest. The result is a cumulative vertically rising graph. It will be evident that the more violent the activity the more rapid will be the rise of the curve; and the height of the curve at any point will be proportional to the total activity up to that time. Mr. Herman Von Dach of this laboratory suggested the use of the Veeder counter as another means of measuring the total activity. This can be operated by the thread connecting the adder with the reducing gear looped around a pulley wheel placed on the shaft of the counter (C). When a kymograph record is not desired the writing unit can be disconnected and the counter attached to the adder by a pulley.

The specifications given have been found satisfactory for the study of activity of chicks. Modifications in cage construction, strength of spring and gear ratio make the method adaptable to animals of larger or smaller size.

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