A shocking grid for pigeons*

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Footshock is reliably delivered to pigeons standing on a surface which functions like a conventional rat grid.

Two shocking surfaces suitable for pigeons have been described in the literature. The first is a painted surface, relatively cheap and easy to prepare, but rather unstable in its physical properties—its electrical resistance changes with continued use (Longo, Holland, & Bitterman, 1961). The second is perfectly stable, but its construction is much more elaborate and costly (Walker & Bitterman, 1968). Both surfaces are resistive sheets which require a special shocking circuit. Moreover, the current through an animal which is placed on such a surface cannot be specified precisely, although a clear correlation between a behavioral measure of the effectiveness of shock (amount of general activity) and the voltage applied to the surface can be demonstrated (Walker & Bitterman, 1968).

We now have developed a shocking surface for pigeons with many of the advantages of a conventional rat grid. As may be seen from the three-dimensional drawing in the lower portion of Fig. 1, the surface is discontinuous—composed of brass rivet heads, $\frac{1}{4}$ in. in diam and spaced $\frac{1}{4}$ in. apart ($\frac{1}{2}$ in. apart, center-to-center). The rivets ($1\frac{1}{4}$ in. long, their shanks $\frac{3}{8}$ in. wide) are set into $\frac{3}{8}$ -in. holes in a $\frac{1}{4}$ -in. Plexiglas plate and are wired together on the underside of the plate in the diagonal pattern which is illustrated in the upper portion of Fig. 1. (All of the rivets whose heads are diagrammed as clear circles are connected to one pole of the shock supply, and all whose heads are diagrammed as stippled circles are wired to the other pole.) The plate is then potted, the underside wiring embedded in about $\frac{1}{8}$ in. of the potting compound from which two insulated leads for connection to the shock supply emerge. The potting serves to waterproof the underside wiring and to firmly connect the rivets to the Plexiglas plate. In the potting process, the entire assembly is dipped into the potting substance up to (but not including) the heads of the rivets, because it is necessary that the shanks of the rivets be electrically

insulated—otherwise, there is the danger that excreta falling on the plate will short the system. The potting material must be flexible enough when set that it will not crack at the base of the rivets and so permit shorting. We have used a moisture-cured urethane, manufactured by Spencer-Kellogg.

The rivet-head surface is perfectly suitable for

Fig. 1. A shocking surface constructed of rivet heads. A three-dimensional view is given in the lower portion. The upper portion shows the diagonal wiring pattern.

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pigeons, which seem to be able to stand and to maneuver on it without difficulty. No scrambler is required because there is no possibility of shorting by excreta and because the wiring pattern is such that it is virtually impossible for the animal not to be in contact simultaneously with both poles of the shock supply—each rivet head is surrounded by oppositely charged heads (see the upper portion of Fig. 1). With a constant-current shock supply, the amount of current passing through the animal at any moment can be controlled and specified. Tests with a general-activity measure like those previously made with the resistive sheets show no failure of shock in many thousands of trials.

The great advantage of this method in work with pigeons is, of course, that it does not require the attachment of wires to the animal. The method proves

well suited also to work with rats—the only modification required is that the center-to-center distance between the rivet heads must be increased slightly to permit larger droppings to fall through. Its advantage for rats is that no scrambler is required because, again, it is virtually impossible for the animal not to be simultaneously in contact with both poles of the shock supply.

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