that presented in Fig. 2. All that is really required is a high-voltage transformer in series with a large resistor (R1) and the string of neon bulbs to provide a relatively constant current. Such a circuit would provide a less constant current than the pentode circuit and ac output as opposed to half-wave rectified dc.

Our experimental experiences indicate that inter-S variability is somewhat less with the neon shocker than with the conventional scrambler, and that avoidance performance is slightly better.

REFERENCE

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NOTE

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A device to prevent fence sitting in shuttle avoidance¹

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A common form of learning that takes place with rats in a two-way shuttle-avoidance box is learning to sit on the fence, avoiding not only the shock but also the necessity of making any other response. Using a modified Lehigh Valley shuttlebox, we have found that up to 20% of the rats tested learn this response. This is a particular problem in situations where the data is automatically recorded since there is usually no way to distinguish fence-sitting Ss from those failing to escape. We have observed Ss fence-sit early in the session without ever having made a response, late in the session after the avoidance response is well learned, or even in the middle of the session with a number of avoidances both preceding and following a number of trials with S on the fence.

Isolating shock to one compartment eliminates many of the early fence sitters. Two response patterns appear to emerge. Some animals scramble wildly, clear the barrier with a single jump, and land in the other compartment. The time between first contact with the second food (completing the shock circuit) and depression of the floor (resulting in shock offset) is minimal or even negative. Hence these Ss receive little or no shock on the safe side. Other Ss jump to the barrier and then slowly crawl into the other compartment and often do receive shock on the "safe" side. So the barrier is the only place in the box without shock and the animals often remain there

Fig. 1. Control circuit for addition of string of NE2s, as described in the text.

for the duration of the session. Without shock on the safe side, S usually completes the crossing response.

An even more effective device is an electric fence, which we use in conjunction with a neon-tube shocker (Bintz, 1970). With the electric fence, none of approximately 250 Ss have been sitters. Several Ss with prior experience in fence sitting were trained with the electric fence, also. All "unlearned" the fence-sitting habit and most learned to avoid.

In the system described the barrier is 1 1/4 in. high and is constructed of 3/8-in. Plexiglas. At 1/2-in. intervals No. 28 holes are drilled through the Plexiglas from edge to edge and 2-in. 6/32 screws are inserted. The top of the barrier appears as a series of screw heads with associated washers. The neon tubes are connected to the screws at the bottom of the barrier and are physically located in 3/16 holes drilled 1/2 in. deep into the plastic between screws. One shock lead is attached to the last neon bulb in the series on the fence, and the other lead is attached to the first bulb in the chain of each compartment so that every point of the fence is hot with respect to any bar in the hot compartment. The same scheme could be used with any shocking device, except that a large number of wires would need to be placed where they are especially vulnerable to biting and pawing. With our technique, no lead is longer than 1/4 in., and the leads are well hidden.

If the fence is electrified with the UCS presentation, neither escape nor avoidance learning precedes as rapidly as it might with an interval between UCS and fence onset. This occurs because Ss avoid approaching the fence after being shocked by it and therefore receive more shock and consequently learn to avoid more slowly (Brush, 1966). If there is an interval between UCS and fence onset (we use 5 sec), most Ss receive no shock from the fence, since they escape soon after UCS onset. The only Ss shocked are those animals on the fence. The control circuit is illustrated in Fig. 1. Relay 1 (R1) is the side selector that senses the location of S and governs the application of shock only to the side occupied by S. Relay 2 (R2) is the fence relay that adds the fence bulbs to

either side circuit at the proper time. This results in a reduction of current that can be compensated for at the control unit or ignored, since S almost always escapes within 5 sec and never receives the reduced current unless on the fence.

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NOTE

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The use of canine plasma protein solution in the laboratory rat

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The use of canine plasma protein solution (CPPS) in dogs has proven helpful in surgical and other veterinary procedures (Fish & Cooksey, 1970; Riggins, Koehler, Brinkman, & Burch, 1968). Riggins et al (1968) report that, in clinical situations, CPPS is useful as the primary therapeutic agent in treating shock in dogs and as an auxiliary agent in treating cases of dehydration, diarrhea, and toxemia. In addition, they report that CPPS significantly increases the chances of survival in dogs bled at known rates; bleeding that caused 100% fatality in control Ss was lethal in only one of three CPPS-treated dogs. Fish and Cooksey (1970) report that CPPS is a suitable replacement for blood transfusions and facilitates the restoration of protein balance in dogs suffering from long-term proteinuria.

The availability of an item such as CPPS for surgical procedures involving the laboratory rat might prove of great assistance, especially in cases where presurgical observation has made the S of more than casual interest. Unfortunately, only about 10 cc of blood can be taken from the average rat (Farris & Griffith, 1949, p. 407), thus making the production of rat blood products exceedingly costly.

The present study investigated the possibility of safely administering CPPS to laboratory rats. The study was directed primarily toward ascertaining whether or not the repeated introduction of canine protein into a rat's system, especially in therapeutic doses, would cause harmful side effects.