AN INTEGRATED RESPONSE AND REINFORCEMENT UNIT FOR CLASSICAL AND OPERANT CONDITIONING OF LARGE MAMMALS¹

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In using the classical defensive reflex conditioning technique, a major source of inconvenience and perhaps error is the fitting of the shock electrodes and response transducer to the foreleg. Many different configurations have been tried (*e.g.*, Lubow, 1959). The present integrated system is made from three components: a cable clamp, a mercury switch, and cable shielding. The total cost is less than \$1. Figure 1 illustrates a top view of the unit.

Fig. 1. The response and reinforcement unit, top view.

The clamp is modified with a nut welded to one flange so that it will accept a thumb screw. This secures the clamp to the subject's leg. Two lengths of shielding, separated from each other, are wrapped around the clamp and serve as the electrodes. The mercury switch is mounted horizontally on the outside of the clamp. The four leads (two from the electrodes, and two from the mercury switch) are then cabled and coiled. All leads going to the subject, and attachments, are permanently fitted to the cable clamp; and, in one operation, both the shock electrodes and the response recording switch are fastened to the subject. The weight of the unit is 43 g. This

can be reduced for smaller animals by using smaller commercially available components.

Figure 2 indicates that the system has the appropriate sensitivity to discriminate between the conditioned response and other responses. The subjects were six sheep and six goats. Each received 20 trials per day for four days. On day one, the 20 trials were preceded by a 1-hr adaptation period; on days 2, 3, 4 by a 15-min adaptation period. The CS was a circular patch of light of 1-in. diameter (Industrial Electronic display unit), with a duration of 4 sec. The US, a brief shock to the foreleg (Hunter, Model 350), followed the termination of the CS. The inter-trial interval was variable with the median and minimum interval being 1 min. Stimulus presentations were pre-programmed. All leg responses, conditioned and unconditioned, were recorded on an event recorder. The free operant rate was measured by counting the responses during the 4-sec period immediately preceding the

Fig. 2. Acquisition of a conditioned defensive leg flexion using the integrated response and reinforcement unit.

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CS. As with the CR, a maximum score of one per trial period was given.

The fact that a low, stable free operant rate can be obtained as well as a stable acquisition curve with a small N indicates the value of the unit. It is clear that the same unit can be utilized in operant as well as classical conditioning and with a variety of species. It would therefore permit a meaningful comparison of

learning procedures where either the procedure or species is the independent variable.

REFERENCE

- Lubow, R. E. and Moore, A. U. Latent inhibition: The effect of non-reinforced presentation of the to be conditioned stimulus. *J. comp. physiol. Psychol.*, 1959, 52, 415-419.