A LIQUID DISPENSER FOR PRIMATES

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The liquid-dispensing apparatus described here can be used as either a simple dispenser or a reinforcement device for primates. It presents controlled amounts of liquid to the subject through a drinking tube when a sucking response is made.

Fig. 1. Liquid dispenser.

As Fig. 1 shows, the liquid in the reservoir flows out of the drinking tube when the solenoid valve¹ is oper-

¹The Eckel Valve Co., San Fernando, California, produces a solenoid valve, Model 135225-1, which is 1 inch in diameter and 1.375 inches long (including inlet and outlet couplings). The outlet coupling has a 0.125-inch-diameter hole.

ated. A sucking response on the drinking tube activates the lip lever that is inset but protruding slightly from the bottom of the drinking tube. The lip-lever movement activates the microswitch by depressing the "Z"-shaped metal piece that has been soldered to the tip of the microswitch actuating leaf.² Direct current connected through the normally open and common points of the microswitch can be connected in series with the solenoid valve to provide dispensing whenever it is desired. Thus, every sucking response operates the valve, which emits a stream of liquid. The lamp above the drinking tube provides a discriminative stimulus when drinking is on a schedule.

An electronic variable timer can be added to the circuit to control the amount of liquid that is dispensed. Each sucking response operates the timer, which, in turn, routes a timed pulse to the solenoid valve. The amount of liquid that is delivered is a function of the hole size in the drinking tube, the fluid pressure from the reservoir, and the duration of the timer pulse. Satisfactory results have been obtained with a 0.125-inch hole in the drinking tube and a timer pulse of 1 second. By varying the length of the timer pulse, the amount of liquid to be dispensed can be regulated from less than 1 cubic centimeter up to any desired amount.

The dispenser can be used with standard reinforcement schedules with either sucking or conventional lever operation as the operant response. With a schedule on which a conventional lever is used, the selected response will turn on the lamp above the drinking tube. The animal can then obtain one measured drink, after which the lamp will be deactivated until the proper lever response is repeated.

Rhesus monkeys and chimpanzees have been trained to respond on the dispenser. Response acquisition is rapid, and the signal lamp is quickly discriminated. The microswitch circuit can be programmed to provide a record of both "on" and "off" responses.

²Haydon Switch, Inc., Waterbury, Connecticut, produces a subminiature switch, catalog series 5300, that is excellent for use with this dispenser.