TECHNICAL NOTE

AN INEXPENSIVE FOOD-PECK RECORDER FOR PIGEONS¹

Instrumentation used to record eating behavior in pigeons has been developed recently. Zeigler and Feldstein (1971) used a photobeam that records crossing immediately above the grain mixture. The method presented here records the actual striking of the grain. The apparatus needs only infrequent monitoring, and is readily adapted to standard food hoppers, *e.g.*, Lehigh Valley No. 114-10.

The recording system consists of a magnetic coil earphone (600 Ω impedance, Superex, Sensi-phone) positioned below a food hopper and an amplifier driven relay. The 1- $\frac{5}{8}$ in. (4.14-cm) diaphragm, which was supplied with the earphone, was positioned under a 1- $\frac{7}{16}$ in. (3.65-cm) hole cut in the bottom of a Lehigh Valley food hopper. The earphone and its diaphragm were held in place by a metal collar bolted to the hopper (Figure 1). The diaphragm and hole were centered below the food aperture. Care must be taken in mounting to avoid reducing the sensitivity of the recorder. Once properly mounted, the relatively large diameter earphones maximizes the amount of area that can be used to pick up food-peck sounds transmitted through the grain mixture.

In addition to the benefit of a large area diaphragm, an earphone was chosen because its sensitivity to vibration is less than that of available microphones.

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Fig. 1. Food hopper and earphone assembly.

The earphone diaphragm maximized the input of sound from the grain above and, at the same time, was not sensitive enough to require extensive filtering out of background sounds of the pigeon moving around in the box.

Amplifier circuits, such as those used for "voice keys", may also be adapted for peck-recording purposes. Otherwise, an inexpensive amplifier circuit (Figure 2) may be used. The circuit contains a series of transistors and a 28-V dc relay driven by a "one shot" circuit.

Fig. 2. Peck recorder amplifier circuit.

Pecks at the grain mixture when the hopper is up are picked up by the earphone, amplified, and converted to discrete relay closures. The system described in Figure 2 has its own power supply to protect the amplifier from stray transients such as those frequently produced by relay programming equipment.

Recording artifacts are produced when the food hopper is activated and slams into place. The same artifact is produced when it is deactivated. These artifacts can be avoided by removing ground from the amplifier-driven relays for a brief period (about 0.3 sec) when the hopper is activated and, immediately, when the hopper is deactivated. The delay should be set long enough to cut out the artifact but shorter than the latency of the first peck.

The peck recorder has been operating for about eight months. Test sessions were conducted to determine whether the momentary peck rates obtained by this recording system were within the range of those reported by Zeigler, Green, and Lehrer (1971). Pigeons that had been deprived to 80% of their free-feeding weights were given four 50-sec presentations of grain with an intertrial interval of 3 min. Pecks per presentation and the time from the first peck to the end of each presentation were recorded. Average rates for two birds were 2.55 and 2.56 per sec. These rates

were within the range reported by Zeigler *et al.* (1971). Cumulative records of food peck responses were very similar to those reported by Zeigler and Feldstein (1971).

For most accurate recording, the bottom of the food hopper should be cleared of pulverized grain every few days if a large number of animals are to be run each day. The level of grain in the hopper should be kept full to ensure maximal sensitivity. The complete cost of parts for the system is under \$35.00. This is considerably cheaper than any commercially available audio pulsed relay system.

REFERENCES

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