Not only have the Kerry rams appeared to be the only active rams during the 'out-of-season' period but they have also appeared to be quicker off the mark at the onset of the normal breeding season. For example, in 1963, by the day on which all three rams had begun to work, a Kerry ram had already served seven ewes over a 10-day period and a Hampshire only one; while in 1964 a Kerry had already served eight ewes over a 14-day period and a Suffolk only two.

There thus appears in these particular rams to be a real difference, during the 'anoestrous period' of the ewes, between the sexual behaviour of the Kerry rams on the one hand, and of the Hampshires and Suffolks on the other. Either the Hampshires and the Suffolks have been almost totally lacking in libido at this time or the ewes concerned have not exhibited a degree of heat detectable by them though it has apparently been patent enough for the Kerrys.

It is not known whether these differences between the rams are associated with differences in semen quality, but semen samples have been collected by electro-ejaculation from two other replicates of similar groups of rams at fortnightly intervals from November 1963 to November 1964 and the results of this work are now being examined.

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PSYCHOLOGY

Substitution of Intracranial Electrical Stimulation for Photic Stimulation during Extinction Procedure

It has been demonstrated that a conditioned response to a peripheral physiological stimulus (CS) can later be evoked when electrical stimulation of the cortical or subcortical centres is substituted for the original conditioning stimulus[1-3]. The present experiment was designed to examine the degree to which electrical stimulation of the occipital cortex, during the extinction stage of an avoidance conditioning procedure, would elicit conditioned responses (CRs) in an animal previously trained to respond to light (CS).

Ten male albino rats, 150–180 days old, with bipolar electrodes chronically implanted in the occipital cortex, were used. The electrodes, insulated with 'Teflon' except at the very tip, were approximately 150μ in diameter. Histological examination showed that the electrodes were in the visual cortex about 0·5–1 mm deep from the surface.

Initially, all animals were trained, in a Skinner box, to press a lever to avoid a mild shock to the feet when a light (CS) was presented. The floor of the box had grids through which the foot shock (US) was delivered. The light emitted by two 25-W bulbs mounted in the box was used as the CS. This light was sufficient to illuminate the interior of the box fairly uniformly. Each trial was initiated by the onset of the CS for 5 sec, after which the US was delivered. Both the CS and the US continued until the animal pressed the lever. If the animal failed to respond within 50 sec after the onset of the US, the CS and US were terminated automatically and it was counted as a trial.

The CR was a lever press within the initial 5 sec of the CS presentation. Forty trials were administered per day with intertrial intervals of 20–40 sec. Animals were trained to make 80 per cent CRs per day for two consecutive days. The day after the last conditioning day, the animals were tested for generalization to electrical stimulation of the occipital cortex. On the test day, the CS–US paired trial was administered for the first 20 trials. Immediately after the 20th trial, the extinction procedure (without a foot-shock) was started. In this procedure, electrical stimulation of the occipital cortex (test stimulus) was substituted for the original CS (light). The test stimulus consisted of a train of biphasic waves of 3 msec duration and a frequency of 35 c/s. The intensity varied among animals between 10 and 120 μamp. The test stimuli were below the threshold for any visible behavioural signs such as a cessation of movements or the appearance of tremors. For each extinction trial, the test stimulus was presented for a maximum of 5 sec. A lever press within this time was scored as a CR. The extinction procedure was terminated when animals failed to make CRs for six consecutive trials. Immediately after extinction to the test stimulus, five animals were subjected to additional extinction trials to the original CS (light). The criterion for the extinction was again six consecutive trials without a CR.

Table 1

No. conditioning trials	No. extinction trials to the test stimulus	No. extinction trials to the CS
160	8	—
240	20	—
400	0	—
880	12	—
440	0	—
240	15	72
160	13	49
480	0	286
160	25	57
160	40	80

Table 1 shows the number of conditioning trials (column 1), extinction trials to the test stimulus (column 3), and extinction trials to the original CS (column 3). Seven out of ten animals trained to the light stimulus showed generalization to the test stimulus. The degree of generalization varied considerably among the subjects (from 8 CRs to 40 CRs). For the group as a whole, there was no correlation between the intensity of the stimulating current and the number of the CRs elicited (P, $-0{\cdot}31$). The three subjects which failed to show generalization to the test stimulus failed also to show any other detectable effects of the stimulation even when the intensity was raised to 120 μamp. This may indicate that the failure of three animals to generalize was due to a lack of an adequate stimulation of the neural tissues. The five animals that were subjected to additional extinction trials using the original CS (light) elicited a large number of CRs. For these animals, there was no significant correlation between the number of extinction trials to the test stimulus and the number of extinction trials to the original CS (P, $-0{\cdot}1$).

These findings agree with previous findings that the intracranial stimulation can be substituted as CS to evoke conditioned responses previously trained to a peripheral physiological stimulus. Studies on stimulus generalization have demonstrated that generalization (*a*) is a decreasing function of the differences between the original and the test stimulus, and (*b*) varies directly with the degree of original learning. The present results, however, indicate that the generalization to the intracranial stimulation used as the test stimulus is not related to the number of acquisition trials or to the intensity of the stimulating current. This may be due to the fact that the neural excitation produced by the direct intracranial electrical stimulation is quantitatively as well as qualitatively different from that produced by the peripheral physiological stimulation.

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