one described by Warner.[1] An essentially similar device has been independently developed and reported by Culler, Finch and Girden.[2] In the present apparatus the rat stands on a grill through which an induction current can be sent. In response to the shock, the rat runs in one direction or another along a narrow pathway. The buzzer used in the conditioning was placed over the center of the apparatus. The light used was furnished by two 100 watt bulbs so hung that the apparatus pathway in which the rat ran was essentially uniformly and brilliantly lighted. Throughout the work there was constantly present a low diffused illumination from a small light placed beneath the milk glass plate on which the apparatus stood. The entire apparatus was placed in a relatively soundproof double box through whose window the rat's behavior was observed. It was arbitrarily decided that the rat's response must equal a run of at least a body length before a response was to be counted. This all-or-none standard, although arbitrary, was based on experience and in actual practise proved satisfactory. A synchronous motor timer made possible the automatic presentation of the buzzer and shock stimuli. The buzzer sounded at one minute intervals. Two seconds after the buzzer, a shock was given the rat if no adequate response to the buzzer had been made. No shock was given if an adequate response was made within 2 seconds to the buzzer. Where the light was used either as a conditioning or as a disinhibiting stimulus, its presentation was timed by the clock, but its switch was manually operated. Otherwise the conditions were the same as they were where the buzzer was used.

The 4 rats who were initially conditioned to the light stimulus required 10, 10, 23 and 27 minutes, respectively, for this conditioning before they reached the stage where they would respond 10 times in succession. They required 72, 43, 66 and 74 minutes, during which the light was presented once a minute without reinforcement, before experimental extinction was established to the point where no response was made for 10 successive presentations of the light. At this point, in place of flashing the light, the buzzer was sounded once. No response was made to the buzzer; but when, one minute later, flashing of the light was again resumed at one-minute intervals without reinforcement, one rat responded 3 times to successive lights, one rat did not respond until the third flash, whereupon 6 successive responses were made, one rat responded on the third and fourth presentations of the light, and one rat failed to respond to the first three presentations. When the new (disinhibited) responses to the light were again extinguished to the point where the rats made no response for 5 successive presentations of the light, the buzzer was again sounded once. All four rats then immediately responded to the light for 2 or 3 presentations before extinction again appeared. The above tests were made at one experimental session per rat. Twenty-four hours later in 3 cases and 72 hours later in one case, the rats were again conditioned to the light, if necessary, to the point where they made 10 successive responses to the light; the response was again extinguished to 10 successive failures to respond; and the buzzer was used for disinhibition. Positive results of the above type were secured for all animals.

The 3 rats who were initially conditioned to run to the sound of the buzzer required 29, 17 and 10 minutes, respectively, before they responded 10 times in succession. They required 66, 58 and 54 minutes for experimental extinction of the response, during which time the buzzer sounded regularly at one-minute intervals, the standard of extinction being 10 successive failures to respond. Three, 9 and 10 days later, respectively, the rats were again conditioned to the buzzer, and again the response was extinguished. In the two series of tests, the light was used 9 times as a disinhibiting agent, used precisely as the sound had been used in the first experiment. In 6 of the 9 cases, the light clearly disinhibited the experimental extinction of the conditioned buzzer response, giving the same type of results as were described above where the buzzer disinhibited the extinguished light response. In the other 3 cases no evidence of disinhibition was present.

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[1] L. H. Warner, *Jour. Genet. Psychol.*, 41: 57–90, 1932.

[2] E. Culler, G. Finch and E. Girden, SCIENCE, 79: 525–526, 1934.

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