Table 1. Summary of electrode placement and results. The recordings were classified by comparing all trials of the last 3 days of the initial noise-alone period, of the noise-shock period, and of the second noise-alone period. A record was said to show changes clearly related to the noise-shock pairing if the values of the background or evoked activity in the shock period did not overlap the values in the initial noise-alone period, and if they returned toward the initial levels in the second noise-alone period. Some recordings which could not meet this strict criterion of no overlap nevertheless contained many individual trials which were beyond the control range, and were classified as showing suggestive changes.

Locus	Total	Changes		
		Clear	Suggestive	None
RW	6	1	4	1
CN	3	1	2	0
Trz	4	2	1	1
SO	1	0	0	1
IC	11	8	2	1
MG	6	0	0	6
AI	2	0	0	2

trials varied from zero to above the control values (bottom curve, Fig. 2). This variability was typical.

During the second noise-alone period, background and evoked activity returned toward control values. However, the evoked activity returned faster than the background activity, and, consequently, the response amplitude was greater than in the first noise-alone period (bottom curve, Fig. 2). The second noise-alone period was unavoidably interrupted for 7 days (arrow, Fig. 2). When noise-alone trials resumed, another decrease in both background and evoked activity was seen, similar to the decrease at the start of the control period and when shock was introduced. Background and evoked activity still had not reached control levels after 41 days of the second noise-alone session (covering 2 months). Noise-shock pairing was resumed, and both background and evoked activity decreased again. There was no consistent correlation between either the background level or response amplitude and the animal's state of arousal. The IC record was the same during the noise-shock pairing whether the cat crouched and hissed or lay relaxed with his head on his paws. In contrast to cortical and thalamic recordings, the integrated level of activity in the IC and CN varies very little with changes from sleep to waking as monitored by electroencephalograph and recorded from the neck muscle by electromyograph (*10*).

Three cats showed a decrease or complete abolition of the IC response to noise after 4 or 5 days of noise-shock pairing, but showed no change in background activity.

Although the IC seemed to be the area most consistently and most markedly affected by pairing noise and shock, suggestive decreases were seen at Trz, CN, and even RW in some of the animals which showed decreases at IC. Some of these changes were marked and long lasting (Fig. 2, CN background activity). Both acoustic and nonacoustic contractions of the middle-ear muscles were monitored by recording the microphonic potentials at the RW (*8, 9*). Contraction of the middle-ear muscles can attenuate the sound delivered to the receptor even if the sound delivered to the tympanic membrane is held constant (for example, with earphones). In two of the six RW recordings, the noise-evoked sustained response decreased by the equivalent of a 10- to 15-db decrease in SPL after the noise had been paired with shock. The RW response to the onset of noise (before the acoustic reflex contraction) was also decreased, indicating that the middle-ear muscles were tonically contracted in the silent intervals before and between noise presentations.

Recordings from two electrode placements in the AI cortex and six placements in the MG showed no changes when the noise was paired with shock.

Previous studies of subcortical sensory activity in behavioral situations have been criticized because of inadequate control of sound (or light) stimuli, ear-muscle (or pupil) effects, movement, or degree of arousal (*8, 11*). These factors were accounted for in the present experiment. The results show that the animal's experience modifies the evoked neural activity along the auditory pathway, particularly at the IC. Even the receptor response may not be a simple function of the physical characteristics of the sound stimulus. The most striking finding was that the background activity is also modified by the animal's experience. Background activity is often ignored or treated as "noise." The present observations show that the background must be considered in evaluating evoked activity, and also as a significant physiological variable in itself.

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12. This work was begun with the guidance and inspiration of Dr. R. B. Livingston and continued with the encouragement of Dr. I. Tasaki. Much of the drudgery was borne by P. Kenny, J. Stichman, M. F. Roark, and R. Strother. I am grateful to Mr. Ron Sandlin, who devised the successful instrumentation. Dr. G. L. Rasmussen generously helped on anatomical questions.

2 June 1965

Lactate Dehydrogenases in Trout

To Goldberg's report of the discovery of nine lactate dehydrogenase isozymes in the speckled trout [*Science* **148**, 391 (1965)] I can add that at least nine LDH isozymes are also present in the rainbow trout, *Salmo gairdnerii*. Using the electrophoretic method of S. Raymond [*Ann. N.Y. Acad. Sci.* **121**, 350 (1964)], I have separated a tenth LDH fraction from the blood plasma of this trout. I have not as yet found the tissue of origin. These results support Goldberg's belief that a third genetic locus is involved in the synthesis of LDH and perhaps other proteins.

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1 July 1965