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Heart Rate and Respiration Preceding and Following Audiogenic Seizures in the White Rat.

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In the past 3 years many papers have appeared on the subject of audiogenic seizures. In continuation of previous work[1] it was felt that better insight into the phenomenon would be obtained if a method of recording the physiological factors involved could be devised. This paper describes such a method.

The heart rate was recorded by a Davis electroencephalograph. The 3 electrode leads were soldered to the tops of 3 bicycle valve caps; these caps were held on the animal by suction* applied through tubes leading to each of the caps. The electrodes were applied behind the right and left shoulders and on the midline ventrally. The hair on these areas was trimmed and Cambridge electrode jelly was applied. From these electrodes the heart rate of the animal was recorded (Fig. 1). Respiration (Fig. 1) was recorded by means of a Phipps and Bird accordion type pneumograph, on the tape of the electroencephalograph.

To obtain maximum quiescence during recording, advantage was taken of the rat's fear of height. The animal was placed about 5 feet from the ground with its forefeet and hindfeet on separate perches. These perches were one quarter inch wide and projected 2

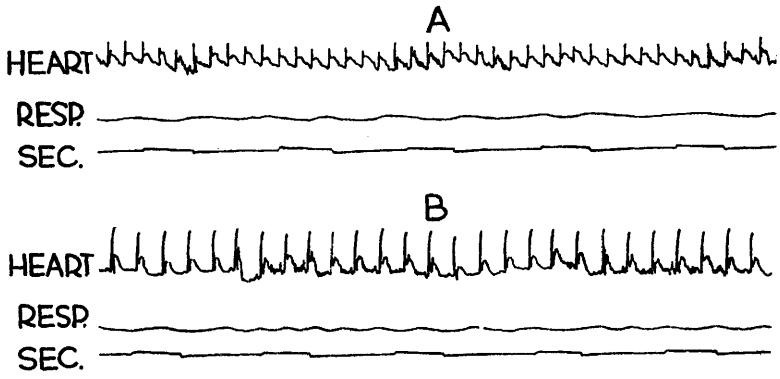

FIG. 1.
A. Heart-rate and respiration preceding an audiogenic seizure.
B. Heart-rate and respiration following an audiogenic seizure.

[1] Humphrey, G., and Marcuse, F., *Am. J. Psychol.*, 1939, **52**, 616; *J. Comp. Psychol.*, 1941, **32**, 285.

* A small Marathon electric suction tank is run continuously.

inches from the middle of a vertical board. The distance between them could be adjusted to the size of the animal. With this procedure the rat remained almost motionless, and it was possible to adjust the pneumograph around the animal so that it was in contact with the animal only and did not touch any part of the apparatus. The weight of the pneumograph was counterbalanced by a weight on a pulley over the vertical board. This method also facilitated the placing of the ventral electrode.

In Table I are presented the preliminary results concerning heart rate and respiration preceding and following audiogenic seizures in the same animal. The seizure in Rat 2 occurred after 55 seconds of stimulation by a common electric door bell. In Rat 7 the seizure occurred after 25 seconds and was accompanied by ejaculation of semen. Post-seizure records were started approximately 2 minutes after the onset of the passive phase. Data were obtained by sampling the first 5-second interval of every minute. Fig. 1A and 1B are examples of such sampling.

A decrease in heart rate, variability of respiration and an increased range of the indices following audiogenic seizures are indicated.

The short time period required for the onset of a seizure and the ejaculation of semen in Rat 7 suggest, on the basis of previous results, a more susceptible animal. This relationship between the degree of susceptibility to audiogenic seizures and the resultant effects on heart rate and respiration over a prolonged period is at present being investigated.

TABLE I.
Heart Rate and Respiration Before and After Audiogenic Seizures.

Before seizure			After seizure		
Min.	Heart (Rate per min.)	Respiration	Min.	Heart (Rate per min.)	Respiration
		Rat 7.			
4	480	156	1	312	132
3	456	156	2	324	144
2	480	156	3	360	132
1	456	168	4	348	108
Mean	468	159	Mean	336	129
Range	24	12	Range	48	36
		Rat 2.			
4	444	108	1	300	108
3	480	108	2	444	132
2	480	108	3	468	120
1	456	108	4	420	96
Mean	465	108	Mean	408	114
Range	36	0	Range	168	36