

Diurnal Variation in the Free Activity of Sheep and Pig.

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In the investigation of the problem of experimental neurosis in animals, one of the possible causative factors to be considered is restriction through habituation of the animal's freedom of movement. As an approach to this part of the problem, a study of the animal's spontaneous activity previous to any restriction becomes pertinent.

Experimental neurosis in the sheep leads to a permanent state of hyperexcitability with loss of formerly established discriminations.¹ In the dog the neurosis may manifest itself in chronic somnolence or in hyperexcitability during the conditioning tests.² It is reasonable to suppose that the absence of the enduring somnolent or inhibitory experimental neurosis in the sheep may be related to the fact that the sheep does not sleep as the dog does. The pig is a sound sleeper and for this reason it was decided to compare the diurnal cycles of spontaneous activity in these sleeping and non-sleeping animals.

The subjects for investigation were 10 sheep, of both sexes, ranging in age from 1½ to 8 years, and 5 pigs from the same litter, 14 months old, 3 females and 2 males, one castrate. The sheep and male pigs ran in a 15-acre pasture while the sows were limited to a one-acre field. Each of the animals wore a standard New Haven pedometer attached to a harness. They had all become thoroughly habituated to the harness before any records were taken. The pedometers were read twice daily, at 6 A. M. and 6 P. M. Readings were continued for a period of 16 days, from October 15 to October 31. At this season of the year, the intervals between readings corresponded closely to the actual hours of daylight and darkness.

The pedometers were calibrated at the beginning and end of the study by determining the number of pendulum movements per recorded mile for each. The table shows the average amount of

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¹ Anderson, O. D., and Liddell, H. S., *Arch. Neurol. and Psychiat.*, 1935, **34**, 330.

² Pavlov, I. P., *Conditioned Reflexes*, London, 1927.

activity (steps taken) by the sheep and pigs during 24 hours, and the division of this activity between day and night.

	Day	Night
	%	%
Sheep	2629 (78)	714 (22)
Pig	3130 (88)	386 (12)

The ratio of day to night activity for the pigs is more than twice that for the sheep. How strongly the pig's free activity is conditioned upon daylight is shown by this observation: at the beginning of the experiment when there was light at both 6 A. M. and 6 P. M. the pigs were found moving about the yard at these hours; but toward the end, when it was dark both morning and night, the pigs always had to be roused from sleep.

Two incidental influences upon free activity may be noted. In certain of the female animals there was an opportunity during the course of the experiment to observe the effect of the oestrous cycle. For example, one sow during heat ran 8700 steps in 24 hours as contrasted with an average of 4001 steps for 10 other 24-hour periods when not in heat. A striking manifestation of the sow's hyperactivity was her tendency to run about at night; in the night of the selected 24-hour period during heat she took 2243 steps as contrasted with an average of 346 for 10 other nights. The weather also seemed to have some effect on the activity of the animals. During the 2 coldest nights the sheep and pigs' activity was reduced by nearly 25%.

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Studies in Sympatheticomimicity, III: Physiological Effects of More Non-amino Catechol Derivatives.

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Muhlmann¹ was the first to point out that catechol (3,4-dihydroxy-benzene) produced a rise in the blood pressure of the intact anesthetized rabbit. Dakin² attributed much of the typical action of epinephrine to the catechol nucleus. Later, Barger and Dale³

¹ Muhlmann, *Deutsch. Med. Wochensh.*, 1896, **22**, 409.

² Dakin, *Roy. Soc. Proc. B.*, 1905, **76**, 498.

³ Barger and Dale, *J. Physiol.*, 1910, **41**, 19.