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**388. Physiological properties of cerebral cortical motor systems of unanesthetized monkey.** JOHN C. LILLY, JOHN R. HUGHES AND THELMA W. GALKIN. *Natl. Inst. of Mental Health, Bethesda, Md.*

In 7 unanesthetized monkeys containing arrays of 25 to 610 electrodes in various cortical areas, studies of motor responses have been made in various physiological states. The classical threshold motor response is elicited by trains of electrical pulse-pairs occurring at 60/sec. in 3- to 5-sec. trains repeated once per minute. The critical frequency range for this response is from about 30 to 250 pulses/sec. During a threshold train of indefinite length, a response occurs only once, after a latency of  $\frac{1}{2}$ -4 sec. and lasts 10-15 sec. In a long series of trains with a given train duration, there is a minimum critical value of inter-train interval below which only one response occurs. Train durations less than a critical value do not produce responses unless current is increased above the threshold value for the train of indefinite duration. The threshold values rise during dozing and sleep, fall after meals, and can either rise or fall during contemporaneous motor activity not elicited by the electric stimuli. Very low frequency (1-2/sec.) stimuli produce responses which show similar changes in threshold, can be suppressed and/or facilitated by previous high frequency subthreshold trains, and show 'spontaneous' changes in amplitude varying continuously, but not necessarily periodically, over 5-10 sec. intervals. Using pulse pairs of opposite sign and of equal charge, of various shapes and various inter-pulse intervals, it was found that the constant-quantity interval for excitation of these two types of responses is approximately 100  $\mu$  sec.