41. Lilly, John C., John R. Hughes, and Thelma W. Galkin. 1956. "Gradients of Motor Function in the Whole Cerebral Cortex of the Unanesthetized Monkey" (Abstract). Fed. Proc. 15

Made in United States of America

Reprinted from FEDERATION PROCEEDINGS
Vol. 15, No. 1, March, 1956

47

387. Gradients of motor function in the whole cerebral cortex of the unanesthetized monkey. JOHN C. LILLY, JOHN R. HUGHES, AND THELMA W. GALKIN. *Natl. Inst. of Mental Health, Bethesda, Md.*

A study of the literature on motor mapping of the anesthetized cerebral cortex of the monkey shows that electrical stimulation of a large fraction of the cortex can produce movements (SCHÄFER, W. K. SMITH, LIVINGSTON, WALKER AND WEAVER, VON BECHTEREV). The extent of the responsive areas varies with anesthetic level; the area most resistant to anesthesia is the classical precentral 'motor area.' In each of 6 monkeys, we implanted one or two 1-cm^2 arrays containing 25–121 electrodes over various cortical areas, from occipital to frontal. In the unanesthetized state, motor responses were elicited from every such area. In order to see if there were any 'silent gaps' in the motor map, we stimulated cortex at each of 610 electrodes implanted over a large fraction of a single hemisphere in one monkey. Movements were elicitable at each electrode, from frontal pole to those in *area 17*, and from near the midline to those over temporal cortex. No gaps were found. These results confirm those of the above workers: in *areas 6* and *8* (eyes and head); *4*, *3*, *1*, *2*, *5* and 7 (face, arm, back, and leg); *19*, *18*, and *17* (eyes and head); and *21* and *22* (ear). In addition, eyes, head, and ear movements were found in *area 9* all the way to the frontal pole; and eye-head movements in the lateral part of *22*. Threshold values are lowest in areas adjacent to central sulcus, and increase with distance anteriorly and posteriorly from this region. These results suggest that motor functions are distributed throughout the unanesthetized cerebral cortex in the normal state, and, imply, when correlated with sensory maps, that each small area of cortex is truly 'sensori-motor' with a preponderance of one or the other function.