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Traveling waves of action and of recovery during responses and spontaneous activity in the cerebral cortex. JOHN C. LILLY AND RUTH CHERRY*. E. R. Johnson Foundation, Univ. of Pennsylvania, Philadelphia.

By recording simultaneously the activity at 25 electrodes on the surface of 0.64 sq. cm. of the ectosylvian region of the cat's cortex, we have demonstrated traveling forms, or 'apparitions', in the electrical activity; different kinds of apparitions can be seen during responses to short (1 ms.) click stimuli and during spontaneous activity (Joint AIEE-IRE Conference 1949, 8-33, Am. Inst. of Electrical Engineers, N. Y. C., 1950.) Each apparition consists of at least 2 different main waves—one during action and one during recovery. The angle between the path of the action wave and that of the recovery wave of an apparition varies from 90° to 180° from one region to another. After the arrival of an afferent volley at the primary receiving area, action waves start from centers in Acoustic I and II and travel at about 1 m/sec. to their boundaries. Slow action waves (0.1 m/sec.) can be excited by these fast waves at the boundaries and travel into the posterior ectosylvian region (Ep) if anesthesia is light enough. These slow response waves may converge on a definite small region in Ep. Spontaneous action waves in Ep in the absence of click stimuli travel at about 0.1–0.2 m/sec., and, usually, originate in or near the region on which the slow response waves tend to converge. Spontaneous apparitions spread from the region first activated, become rather large (about 20 sq. mm.), and then travel ventrad along Ep. Response recovery waves have velocities of 0.1 m/sec. in AI, AII, and Ep. Spontaneous recovery waves in Ep have velocities ranging from 0.05–0.3 m/sec. It is possible that the directions and the velocities of these cortical apparitions may be determined by temporal dispersion and feedback, spatially distributed. These and other results suggest that Ep functions as an analyzer of responding waves in AI and AII and/or as a modifier of the activity of these waves. (Supported in part by USPHS division of Research Grants and Fellowships.)