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This Week's Citation Classic

Kimble D P. Hippocampus and internal inhibition.
Psychol. Bull. **70**:285-95, 1968

Behavioral effects of hippocampal lesions are reviewed in a theoretical framework which suggests that the intact hippocampus is important in allowing animals to alter their behavior when environmental contingencies change. The hippocampus is proposed to interact with brainstem and thalamic arousal systems in these situations. [*The Science Citation Index*® (*SCI*®) and the *Social Sciences Citation Index*™ (*SSCI*™) indicate that this paper has been cited 217 times since 1969.]

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"I first became interested in the hippocampus in the late 1950s as a graduate student at the University of Michigan Robert Isaac-son came in one day very excited about a recent report by Wilder Penfield and Brenda Milner concerning two neurological patients who displayed an amnesia for recent events, without either gross dementia or longer term amnesia Penfield and Milner suggested that hippocampal destruction was responsible for this syndrome Not having access to such patients, Isaacson persuaded Robert Y. Moore (now at the University of California School of Medicine at La Jolla) to show us how to locate and aspirate the hippocampus in laboratory rats Using this approach, I completed my disseration with Isaacson (now at the University of Florida), examining several different behavioral effects of hippocampal lesions in rats It soon became apparent that while there were some interesting behavioral changes, the recent memory loss seen in the human patients was not obvious in our animals

"I came to the University of Oregon in 1963, where I was aided greatly by the stimulation and collaboration of my wife Reeva and several outstanding graduate students These included Gary Coover, Ernie Greene, Linda Gummow, Carolyn Harley. Robert Kirkby, and Don Stein We soon found ourselves struggling to find some conceptual framework into which to fit our various results as well as those of others In several experiments we had been impressed by the dramatic persistence of the rats which had undergone hippocampal ablations to carry out previously learned tasks even when reward was no longer given For example, we discovered that our lesioned rats would continue to run rapidly to an empty goal box which had previously contained water even after 100 or more consecutive unrewarded trials Normal rats or rats with brain lesions restricted to the neocortex which overlies the hippocampus, would cease responding to such 'extinction' situations in less than 25 trials In rereading Pavlov on experimental extinction it occurred to me to relate our findings to the theoretical notions of Pavlov, using his term of 'internal inhibition.' The final theoretical idea that went into the Bulletin paper was Magoun and Morruzzi's concept of the brainstem reticular formation and its thalamic connections as 'arousal' mechanisms. I proposed that the hippocampus might exert some inhibitory effects on those arousal systems

"In the decade since publication, many experimenters have enlarged the possibilities concerning hippocampal functions, and, of course, our own ideas have changed too. although the exact role of the hippocampus in behavior remains speculative The paper concluded: 'If the present formulation is useful for further research and speculation on hippocampal function, it will have served its primary purpose ' I am encouraged by the citation data-to believe that this has happened."