It was shown by the technique of conditioned-reflex activation of a functional epileptogenic focus that seizure activity in response to a conditioning stimulus in rabbits and cats arises exclusively in the hippocampus, even if the epileptogenic focus is created by electrical stimulation of the septum or amygdala. During stimulation of the hippocampus itself, "spontaneous" reactivation of seizure activity took place, but in response to the conditioning stimulus only an increase in the frequency and strength of the spontaneous epileptiform activity was observed. Conditioned-reflex seizure activity was much more marked in rabbits than in cats. After bilateral electrolytic injury to the septal region no marked seizure activity was observed in rabbits in response to a conditioning stimulus. In that case there was only an increase in the frequency of spontaneous epileptiform activity in the hippocampus. It is concluded that the hippocampus, with its synchronizing function, can perform the role of initiator of seizure activity, and the functional link between the septum and hippocampus brings about its final synchronization.

INTRODUCTION

It can now be regarded as proven that structures of the limbic system of the brain play a particularly important role in the genesis of epileptic activity. Most workers consider that the structures of the limbic system differ in their seizure activity, although there is no general agreement on this matter. Some workers consider the hippocampus to be the most epileptogenic structure of the limbic system [2, 9, 13, 14, 16, 18, 19, 21, 26], others the amygdala [15, 20, 23, 25]. Moreover, as yet there is little experimental evidence on

Fig. 1. Increase in frequency of spontaneous epileptiform activity in response to conditioning stimulus in rabbit (left amygdala stimulated). Horizontal line shows time of action of conditioning stimulus: 1) sensorimotor cortex, 2) left amygdala, 3) left dorsal hippocampus, 4) left septum.
Fig. 2. Seizure activity in response to conditioning stimulus arising in two (a, b) rabbits (left amygdala stimulated). a: 1) Left ventral hippocampus, 2) right amygdala, 3) left amygdala, 4) right ventral hippocampus. b: 1) Left dorsal hippocampus, 2) left amygdala, 3) right dorsal hippocampus, 4) right amygdala.

Functional relations between the structures of the limbic system during the initiation of seizure activity. The writer [7] showed earlier that repeated electrical stimulation of limbic structures leads to the formation of a functional epileptogenic focus; under these circumstances definite functional relations are