Very many original investigations and surveys devoted to inhibition of peripheral responses which have become biologically inadequate for certain conditions have been published [1-6, 8, 9, 11, 13, 15-18, 20, 22]. Nevertheless, the neurophysiological mechanisms of internal inhibition still remain unexplained. There is likewise no general agreement in the literature on its localization.

The available data of the possible mechanisms of internal inhibition at the cellular and synaptic levels are mainly concerned with neurophysiological mechanisms of extinction of the orienting reflex [20] or habituation to prolonged repetition of a stimulus, which in most studies has been carried out under model conditions on preparations of various types [5, 28].

Changes in unit activity during the formation of inhibition of conditioned reflexes have been studied in most cases not specially, but mainly in order to determine the specific nature of responses arising to reinforced stimuli. On the removal of reinforcement and during the action of differential stimuli either a decrease in the intensity of the responses or the appearance of responses opposite in sign to those to the reinforced stimuli is observed [4, 8, 11, 12, 17, 21, 22].

In order to study the possible participation of inhibitory processes known in neurophysiology in the organization of internal inhibition, the use of flashes as conditioned stimulus (CS) is a convenient model. Short specific stimulation of the visual system evokes phasic unit response at all its levels, in whose organization, as intracellular recording shows, an essential role is played by the alternation of depolarization and an active inhibitory process, namely hyperpolarization of the IPSP type [7, 10, 19, 26, 30].

Slow late negative-positive components of evoked potentials (EP) [10], similar in their genesis to spontaneous bioelectrical activity [7, 14, 24, 27], correspond to phasic responses of visual cortical neurons. It is suggested that an essential role in the organization of these two types of activity is played by recurrent and also, perhaps, afferent inhibition [7, 10, 15, 20, 26, 30].

A special investigation of changes in combined slow potentials and spike activity of visual and sensomotor cortical neurons during the formation of different types of internal inhibition of defensive conditioned reflexes to flashes was undertaken and is described below.
Fig. 1. Combined slow potentials and unit activity during formation of delayed conditioned reflex. Rabbit No. 118, 17th application of combinations with delay of reinforcement increased from 2 to 4 sec. M) Myogram; H) Slow potentials recorded from hippocampus; S) from sensomotor cortex; V) from visual cortex. Upward deflection denotes increased negativity. Index small m denotes recording of spike activity from corresponding areas. Top row of arrows marks flashes; bottom row ESL. Calibration: 250 μV, 1 sec.

Fig. 2. Changes in ECoG and unit activity in sensomotor cortex during formation of conditioned inhibition and extinctive inhibition. Rabbit No. 121. A) 63rd application of flashes (arrows) against background of continuous light (on-off shown by lozenges). B) 21st combination of flashes with ESL; first two arrows mark flashes + ESL. C) 96th extinction. Remainder of legend as in Fig. 1.