Although such considerable changes in RF and spontaneous activity of the neurons may be regarded as a regional feature distinguishing this part of the cortex, substantial dynamic changes in the structure of the neuronal responses also were observed in the primary visual cortex [8] and nonprimary visual structures [3].

This investigation thus revealed considerable variability of the shape, size, and orientation of RF. Most RF were very large. Considerable fluctuations were found in the time of the spontaneous discharges and evoked unit activity. A further and more detailed analysis of plastic reorganizations of the RF of these neurons and their responses to moving stimuli would be interesting.

LITERATURE CITED

POSITIVE AND INHIBITORY CONDITIONED REFLEXES TO ELECTRICAL STIMULATION OF THE AMYGDALA

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There is no problem in the physiology of higher levels of the CNS at the present time which has been researched so intensively and from so many different aspects as that of motivated behavior, including in particular the question of interaction between various structures of the limbic circle and the contribution of each of them to the organization of complex behavioral responses of different biological character [5, 6]. Widely different methods have been used: starting from morphological and ending with methods connected with microinjection of physiologically active substances. In E. A. Asratyan's laboratory, where the role of various deep brain structures in complex conditioned and unconditioned reflexes has been studied systematically for several years [1, 4], the method of formation of positive and inhibitory conditioned reflexes to electrical stimulation of structures of the limbic circle is used [2, 3].

One of these investigations was that described below, whose aim was to verify the possibility of forming a conditioned food-getting reflex to stimulation of the lateral amygdaloid nucleus and, if it could, to attempt to form differentiation to it by stimulation of other deep structures.

Experiments were carried out on two cats on which similar results were obtained. As a first step nichrome electrodes were inserted into the amygdala (lateral and basal nuclei) and hypothalamus (lateral nucleus). A biphasic current was used for stimulation (pulse duration 0.5 msec, frequency 100 Hz, exposure 2-3 sec, pauses between stimulations from 2 to 5 min). A conditioned reflex of visiting the feeding bowl was formed to stimulation of the lateral amygdaloid nucleus (LAN) by a current a little above the threshold level. The natural
unconditioned response to stimulation of LAN under these circumstances consisted of blinking, abrupt opening of the mouth (sometimes of distinctly vomiting character), and changes in respiration. In the first stage of reflex formation, immediately after electrical stimulation the animal was led passively from the starting area to the feeding bowl. As soon as the cat crossed the conventional boundary of the feeding zone (photoelectric relay) meat was dropped into the feeding bowl.

The first spontaneous visits to the feeding bowl in response to conditioned stimulation appeared in both cats by the 70th combination of stimulation of LAN with food. During subsequent combinations the reflex quickly became consolidated and reached the 100% criterion of appearance (visiting the feeding bowl and returning to the starting area). By the 140th combination the latent period of leaving the starting area (from the beginning of conditioned stimulation) had shortened to 1-2 sec (from an initial 7-8 sec at the beginning of conditioning). It is worth noting that the natural effector response to stimulation of LAN was considerably reduced in the first experiments with conditioning, although it persisted in weakened form until the 200th combination. Figure 1A shows an example of recording of a positive conditioned reflex (262nd combination). Stimulation (6) evokes turning of the head toward the feeding bowl (5), leaving the starting area (6), approaching the feeding bowl (7), which is reinforced by dropping meat into the bowl (7). After eating the meat (4) the animal leaves the feeding bowl (7), turns away from it (5), and returns to the starting area (6).

In the stage of the first manifestations of the conditioned reflex electrical stimulation of other structures was tested. During stimulation of all structures a conditioned reflex appeared through a mechanism of generalization. Experiments to form differentiation were then started. Stimulation of the basal amygdaloid nucleus (BAN), i.e., a structure innately more