

ned movement. These modifications of cortical excitability are therefore closely related to the performance of CR.

It is concluded that, while by means of atropine an apparent dissociation between electrocortical rhythms and behaviour may be obtained, the underlying cortical activity which cannot be revealed by the study of the EEG is still preserved when the "closure" of the conditioned circuit is obtained.

956 Computer Analysis of Hippocampal EEG Activity and Impedance in Approach Learning: Manipulation with Psychotomimetic and Hallucinogenic Drugs. W. R. ADEY (U.S.A.).

Cats trained in T-maze visual discriminative and delayed response tasks exhibit trains of regular theta waves at 5 to 6 cycles per second in the hippocampal system during performance of the learned task. Patterns of slow waves, more complex than those in the hippocampus, but centered in the same frequency band, occur simultaneously in subthalamic areas, midbrain reticular formation, and less regularly in occipital and frontal cortical areas. Extensive autocorrelation analyses of these wave trains have confirmed their presence regularly during the discriminative epoch. They have been further characterized by cross-correlation, auto- and cross-spectral analyses, and phase detection techniques. These mathematical analyses have detected patterns in the hippocampal wave trains relating to the level of learning, and have indicated, by three different techniques, changes in wave patterns relating to correctness and incorrectness of decisions. The evidence suggests that handling of information in the cerebral system may be on the basis of spatio-temporal patterns in these waves. Relationships have been found between the occurrence of these wave trains and electrical impedance changes in the same tissue, with impedance changes appearing only after behavioral performance improves above chance levels. The behavioral performance has been manipulated with psychotomimetic cyclohexamines and with LSD, psilocybin and psilocin. Concomitant electrophysiological studies have indicated that both groups of drugs induced profound changes in the hippocampal wave activity and impedance, and that deterioration in behavioral performance occurred in strict relation to interference with normal wave patterns. Hippocampal tissue exhibited a greater susceptibility to these drugs than subcortical and cortical areas examined.

57 Discussant. Instrumental Reward Discrimination in Rabbits. Electroencephalographic and Behavioral Effects of a Series of Lysergic Acid Derivatives. L. DE BARAN (Italy).

The influence of several lysergic acid derivatives was studied on the performance of instru-

mental reward discrimination (IRD) as well as on the cerebral electrical activity (EEG) of freely moving rabbits. The IRD was established in the following way. Rabbits bearing chronically implanted cortical and subcortical electrodes were first trained to pull a ring at the sound of a buzzer for a food reward. The animals were then taught to discriminate between a continuous buzzer (which was followed by a reward) and an intermittent buzzer (which was not followed by a reward).

The effects of the following compounds upon the different components of the IRD and upon the EEG were investigated: lysergic acid (LA) ethylamide (LAE), LA-propanolamide (ergometrine), LA-butanolamide (methylethylergometrine) LA-1-methyl butanolamide (UML) and LA-pyrrolidide (LPD), LA-diethylamide (LSD), brom-LA-diethylamide (BOL). The most active compounds were LSD, LPD and LAE, which disrupted the performance of the exercise and "flattened" the EEG at a dose of 0.025 mg/kg. Ergometrine and methylethylergometrine had an effect only in higher doses (0.5–1.0 mg/kg). BOL and UML were ineffective.

958 Conditioned Reflexes and Neurotropic Drug Effects. P. S. KUPALOV (U.S.S.R.).

The initial action of drugs of the benactyzine type in low doses on unrestrained (situation-conditioned) animals, is an impairment of the display of voluntary components of complex conditioned acts; the drugs depress conditioned salivation selectively, as well as the cortical component of unconditioned salivation.

On the other hand drugs of Artane or Spasmolytine type at low doses fail to affect complex conditioned reflex patterns, although performance of both conditioned and unconditioned motor acts is delayed as demonstrated on salivation experiments.

Cortical and subcortical activities are thus influenced by different agents. Supportive evidence has been obtained by direct administration of these drugs into the cerebral cortex or the midbrain reticular formation through implanted brain canulae.

Chlorpromazine has an effect similar to that of the second group of agents, besides some peculiar features. It mainly affects nervous processes of a diffuse nature especially processes controlling the general functional state of the cortex, as well as pathological foci of persistent excitation. It also evoked a manifest reflex of approaching conditioned stimuli. These effects of chlorpromazine have also been demonstrated on animals with isolated cortical analyses, the interplay between cortical centers being dependent on subcortical formations, and on animals with restricted cortical lesions, or with the whole cortex isolated by transection of its afferent and efferent connections.

Asynchronous light flashes at different frequencies to each eye resulted in a convulsive