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Metrazol Convulsions and Their Relation to the Epileptic Attack.*

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The convulsions produced by the intravenous injection of metrazol (pentamethylentetrazol) as a therapeutic agent in schizophrenia, were recorded by means of normal and ultra-high-speed motion pictures and by electromyograms. The electromyograms of the activity of antagonistic muscles were recorded simultaneously by 2 matched amplifier systems which operated crystal actuated ink-writing recorders.

The typical metrazol seizure in man is composed of 3 stages: the first clonic stage, the tonic stage and the second clonic stage. The nature of the clonus is entirely different in the 2 clonic stages. As seen from the films and the electromyograms the clonus of the first clonic stage is the result of the alternating contraction of agonistic and antagonistic muscle groups; 2 to 4 of these 2-phase movements occurring per second. The second clonic stage is the result of an alternation between simultaneous contraction and relaxation of all muscle groups. It represents an alternating disappearance and reappearance of the continuous innervation which is present in the tonic stage. The change between contraction and relaxation is very rapid at the beginning of the second clonic stage, 12 to 14 contractions occurring per second. The movements gradually become slower and coarser. Towards the end of the second clonic stage only 1 to 2 contraction seizures occur per second and finally complete relaxation follows as is evidenced by a complete absence of muscle action potentials in the electromyogram.

The tonic stage, which in the electromyogram shows simultaneous high potentials in all muscles, represents a state similar to decerebrate rigidity. The movements of the second clonic stage correspond to an intermittent innervation of the same characteristics which were continuously present during the tonic stage. The second clonic stage, therefore, should be considered as an intermittent appearance of a state resembling decerebrate rigidity.

This explanation is in agreement with the fact that clonic con-

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vulsions have often been observed in decorticated animals.[1-6] Hence, we may conclude that the second clonic stage occurs without any active participation of the cortex. The study of our motion picture records has demonstrated that the average major seizure[7] corresponds closely to the tonic and second clonic stage of the metrazol convulsion. Our electroencephalographic records show that action potentials of a distinct epileptic pattern can be obtained from the cortex during the tonic and following clonic stage.

This raises the question of whether these electroencephalograms are really the expression of some abnormal cortical activity which causes the epileptic attack or whether they are only an accompanying cortical phenomenon indicating that the cortex is influenced by the same abnormal activity of subcortical structure which is the basis of the epileptic attack. This question is of fundamental importance for all interpretations which have been or will be drawn from the use of electroencephalograms in the study of the pathophysiology of the epileptic attack. We are continuing our investigations of this question by recording simultaneously the movements and the electroencephalogram in patients and in animals having variously localized lesions of the brain, during metrazol seizures.

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Effect of 1,2,5,6-Dibenzanthracene on *Fusarium lini*.

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In addition to being able to initiate malignant growth, the carcinogenic hydrocarbons have been shown to stimulate cell division of certain microörganisms. Since it has been postulated that cancer may be associated with an abnormal glucose metabolism, it was

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