ORIGIN, SPREAD AND NEUROSURGICAL TREATMENT
OF THE PSYCHOMOTOR TYPE OF
SEIZURE DISCHARGE*

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Psychomotor epilepsy has been defined as a condition characterized clinically by trance-like attacks and confusional episodes\(^5\) and electroencephalographically by spike discharges which (with scalp recordings) appear to be focal in the anterior temporal region.\(^9,10,12\) Convulsions occur in a high percentage of such patients, and personality disturbances and psychosis are common.\(^11,12\)

In some severe cases of psychomotor epilepsy in which the patient does not respond to medical treatment, unilateral removal of the anterior third of the temporal lobe produces a good therapeutic result.\(^3,4,14–16\) When the focus is unilateral and a unilateral operation is performed, more than 50 per cent of patients are rendered seizure-free.\(^4\) However, only 1 out of 4 patients with independent bitemporal foci is freed of seizures by a unilateral operation. The number of cases in which bitemporal lobectomies have been performed for bilateral psychomotor epilepsy is too small to permit evaluation; in 1 case reported by Terzian and Dalle Ore\(^6\) extensive bitemporal resection produced serious personality changes and disturbances in behavior.

Removal of the anterior third of the temporal lobe does not always eliminate the spike discharges and the postoperative tracing may reveal spikes of the same general type as were present preoperatively. More commonly the spikes are reduced in voltage and have an altered wave-form with a strong positive component (preoperatively, they had a strong negative component). In such cases one is led to wonder whether the surgical attack was misdirected or was not sufficiently radical. The therapeutic result is in general inversely proportional to the amount of residual electroencephalographic "seizure" activity. The present study was undertaken in the belief that if the origin and spread of the psychomotor discharge could be accurately determined, the effectiveness of neurosurgical treatment could be increased.

In the hope of obtaining comparable data on a group which would be in contrast with the psychomotor epileptic group, plans were made to obtain

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observations on a group of schizophrenics who were referred for frontal lobotomy. This latter group turned out to be not so much contrasting as similar. For valid control studies on the electrical activity in the depths of the brain, patients will have to be studied with no evidence of cerebral disorder. The most favorable group for such studies would be patients referred for frontal lobotomy because of intractable pain. Heath et al. have reported some preliminary studies of this type.

TEMPORAL LOBE FUNCTION—LOWER ANIMALS AND MAN

Animal studies have revealed functional connections between the temporal lobe and almost all parts of the cortex, the basal ganglia, the thalamus and the reticular formation of the brain stem, and have shown that the mesial and anterior temporal areas are part of the limbic system. The implications of this new information for neurosurgery were discussed by MacLean in an excellent review published in this Journal. Most of the anatomicophysiological studies on the temporal lobe have been done on animals and it is not safe to assume that these are completely applicable to man, but Kaada and his co-workers have shown that seizures which resemble the psychomotor seizures of man are produced in cats by stimulation of the amygdaloid region. The spread of seizure discharges to and from the temporal lobe of the monkey has been studied in detail by Faeth, Walker and Andy.

In 1938 Klüver and Bucy described the marked changes in behavior that occur in the rhesus monkey with radical bilateral temporal ablations. The Klüver-Bucy monkeys showed psychic blindness of an agnostic type, hypermetamorphosis (constant shifting of attention), emotional changes (tameness, loss of fear, loss of rage, etc.), changes in dietary habit and increased sexual activity. These extreme disturbances of behavior do not occur with either unilateral temporal lobectomy or limited bilateral anterior temporal lobectomy in man, but comparable disturbances have been reported by Terzian and Dalle Ore and Petit-Dutaillis et al. in cases of bitemporal lobectomy.

Heath et al. have observed epileptiform discharges in the depths of the frontal lobes in the “septal” region and also to a lesser extent in the hippocampus of patients with psychosis unassociated with epilepsy. As will be reported in a later part of this paper, we obtained spike discharges from the depths of the brains of schizophrenic patients, and these discharges were indistinguishable from those seen in epileptics. Elucidation of these findings and determination of the site of the discharge in psychotics were added to the problem of delimiting the psychomotor focus because it was felt that a comparison of findings in epileptics with psychosis and in patients with psychosis (but without epilepsy) diagnosed schizophrenia might be informative and might lead to a more rational surgery for the treatment of both psychomotor epilepsy and psychosis.