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Electro-Encephalographic Localization of Atrophy in the Cerebral Cortex of Man.*

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Atrophy of the cerebral cortex involving the fronto-parietal-occipital areas to a greater or lesser degree has been demonstrated in many schizophrenic patients.[1] From our present knowledge of electro-encephalography, one would expect to find some alteration in the relation between the electrical activity of an atrophied region and that of adjacent, normal tissue.

The relationship between the major architectonic regions of the cerebral cortex in "normal" man has been described in terms of their alpha (10 per second) activities.[2] The method consists in determining the amount of alpha wave activity *(per cent time alpha)* in both hemispheres simultaneously from electrodes placed in 7 standard positions along the head about 3 cm to either side of the midline. The electrodes are placed on the scalp over the following cortical regions: tip of the occipital lobe; occipito-parietal fissure; mid-parietal; central fissure (fissure of Rolando); the last 3 electrodes divided the frontal lobe into 3 approximately equal parts. Curves of the distribution of *per cent time alpha* over the 2 hemispheres of "normal" subjects run parallel to each other.

In the present study, 2 to 4 electro-encephalograms were recorded from each of 14 patients, and distribution curves plotted. The patients were selected by Dr. A. Angyal on the basis of certain psychotic symptoms[3] which they exhibited. Very few patients showed neurological signs of cortical pathology.

Records from 6 patients showed one or more cortical regions in which the *per cent time alpha* increased in one hemisphere and decreased in the other, although the electrical activity of both hemispheres ran parallel in the adjacent regions. This was taken as a sign of atrophy. One patient gave a doubtful picture, and 7 were negative. It was not possible to obtain pneumo-encephalograms on all 14 pa-

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1 Bateman, J. F., *Arch. Neurol. and Psychiat.*, 1925, **14**, 616; Jacobi, W., and Winkler, H., *Arch. f. Psychiat. u. Nervenkr.*, 1927, **81**, 299; Moore, M. T., Nathan, D., Elliott, A. R., and Laubach, C., *Am. J. Psychiat.*, 1933, **12**, 801.

2 Rubin, M. A., *J. Neurophysiol.*, 1938, **1**, 313.

3 Angyal, A., *Arch. Neurol. and Psychiat.*, 1936, **35**, 1029.

TABLE I.
Comparison of Electro-encephalographic and Pneumo-encephalographic Findings in 9 Schizophrenic Patients.

Patient	Electro-encephalogram	Pneumo-encephalogram
H.A.	++	++
C.B.	+	+
I.B.	—	+
A.B.	+	++
M.C.	—	—
J.D.	—	—
E.D.	+	+
G.H.	++	++
B.M.	—	—

\+ Limited to small area (usually parietal or posterior part of frontal).
++ Extensive.
— No atrophy.

tients, but a sufficient number were secured to allow comparison with the electro-encephalographic localizations (Table I). In all cases the electro-encephalographic diagnoses were made before the pneumo-encephalograms were taken.

It is interesting that slow, "pathological" potentials, usually associated was brain lesions,[4] were observed only in the 2 patients who had the most marked cortical atrophy.

Summary. It was found possible to localize atrophy of the cerebral cortex in schizophrenic patients by comparing the alpha (10 per second) rhythms of the various regions of the two hemispheres with each other. The findings were confirmed by pneumo-encephalography in 8 out of 9 patients.

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Simplified Rations for Guinea Pigs Suitable for Assay of the Grass Juice Factor.*

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Previous publications from this laboratory have described studies

[4] Walter, W. G., *Proc. Roy. Soc. Med.*, 1937, **30**, 579; Williams, D., and Gibbs, F. A., *N. E. J. Med.*, 1938, **218**, 998.

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