

38. Lilly, John C. 1955. Review of book by Robert G. Heath, et al. 1954. *Studies in Schizophrenia: A Multidisciplinary Approach to Mind-Brain Relationships*. Harvard Univ. Press. *EEG Clin. Neurophysiol.* 7:323-324

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STUDIES IN SCHIZOPHRENIA : A MULTIDISCIPLINARY APPROACH TO MIND-BRAIN RELATIONSHIPS

ROBERT G. HEATH, Chairman

Harvard University Press, Cambridge, 1954, 619 pp. \$8.50

This book is a 610 page "progress report" on one of the most controversial projects to appear in the field of medicine in the last 50 years: it is the story of one of the first attempts to place wire electrodes deep in the brains of human subjects in order to stimulate electrically and to pick up electrical activity. A theory, and its use to justify these procedures, is given by Heath in a chapter on Theoretical Concepts. The main argument centers: (a) around the justification for using patients called schizophrenics, and (b) around the possibilities of helping them.

(a) "The only patients in whom new and untried procedures would be justified were those in whom craniotomy was also justified as a therapeutic measure. The largest group of patients upon whom this appeared to be feasible was the hopeless schizophrenic group — that is, patients who are already undergoing drastic surgical procedures and who had failed to respond with remissions to existing therapy." It is questioned whether or not the fact that several people are performing leucotomies, lobectomies, and thalamotomies is an adequate justification for others to do "new and untried procedures". There seems to be an implicit hope that a new procedure will be developed which is less damaging and more effective than these sacrificial operations.

If one inspects a list of the group of patients (pages 124-125), one finds that about one-half of the 20 schizophrenics were sick less than 4 years and 3 of these were sick for less than 2 years; in this half, there were 4 whose ages were 21, 20, 19 and 17 years. One may question whether or not these durations of illness, especially in the 4 young cases, are long enough to find out if "remissions" can occur, and whether or not "existing therapies" can do more for the patient than "new and untried procedures". The procedure was also tried on 3 "terminal" patients without schizophrenia (cancer (2) and tuberculosis(1)).

As for (b) the possibilities of helping patients with schizophrenia by deep stimulation, the major argument rests on a mixture of theories from Bleuler, Sandor Rado, Hans Selye, and a psychological-neurophysiological theory. This argument is as follows: the schizophrenic patients selected for trial have a basic lack of feeling; a subnormal response to stressful stimuli; an inhibited background motor activity; a basic physiological defect dating from early child-

hood or before; and psychotherapy alone cannot correct the basic defect.

The "basic" mechanism is visualized as follows: "Activity at the level of the cerebral cortex induces a markedly abnormal subcortical rhythm which in turn spreads back to cortex, producing additional physiological effects on the cortex which are reflected clinically as abnormalities in the thinking and learning processes...We...hypothesized that the abnormal reverberating subcortical circuit was activated by stressful stimuli received from the cortical level. On the basis of clinical observations we assumed that the over-all effect in schizophrenia was one of cortical impairment." The Papez "emotional circuit" (septal nuclei, fornix, etc.) is postulated as involved in the above "subcortical circuit". "We therefore resolved that if the subcortex was functioning abnormally as a result of cortical firing, then electrical stimulation to the basal part of the septal region might stir it into more normal activity, thus facilitating cortical activity and bringing the individual out of the sleep-like state of reverie and helping him make a better interpretation of reality. It was hoped that the stimulation procedure might enable him to perceive his emotionally charged conflicts in terms of the here and now rather than in the infantile terms which the disease process had established."

Critiques (by this reviewer and by others) of this theory are given in the book (Discussions). There seems to be no way of testing this theory experimentally, on animals or man. Such mixtures of clinical observations, psychiatric theory, neuroanatomical circuitry, neurophysiological activity, and psychotherapeutic hopes are, to put it mildly, very difficult to test.

Two ways of placing the electrodes were used: the "open" and the "stereotaxic" methods. In the "open" method, the leads were placed under direct vision in the ventricle through a hole in skull and cortex. For the first 20 patients mentioned above, this was the only method used. In later patients, a human stereotaxic instrument is employed with X-ray localization; one case of this later series is reported in this book (Addenda).

With the open method, the severity of the damage to brain and the incidence of complications were high enough to lead to its abandonment. However, most of the book is devoted to the patients who were

exposed to this procedure. It is very difficult to interpret the results in any systematic terms with the high degree of complicating damage and sequelae which were present.

Irrespective of the above assumptions, justifications, and difficulties, one may well ask whether or not the results were striking enough to warrant using such procedures. On page 344 is a summary of the psychiatric evaluation of the 20 patients by Monroe and Heath: if one excludes the overlapping groups of the deaths (2), the "technical failures" (3), those operated on twice (2), and those with complications (coma, seizures, and/or fever) (12), there are 5 patients left: their improvement ratings are "significant improvement; psychosis still evident; still in hospital" (4) and "no improvement" (1). This group of 5 seems to be one in which the results may be attributable to the procedure — they are not sufficiently improved to leave the hospital.

If one looks at these results from the view of what happened to those who did best ("out of hospital; working; minimal defect") excluding the "technical failures" and deaths, one finds that all had "complications" (4): three had seizures (one of these also had coma) and one had fever. (At the 12 months follow-up, one of these 4 patients is back in the hospital (seizures continued).) Is it possible that

seizures and possibly fever cause more improvement than the procedure alone? It is difficult to find out: the operative procedure itself, without considering electrical stimulation, introduced many indeterminate variables: extent of temporary and permanent cellular and tract damage to small but potent areas of the brain, ventricular system infections, psychological impact of a craniotomy, etc.

The importance of this book is not that it reports bad theory, poor experiments, and unending ethical rationalizations: these matters are obvious to anyone who takes the time to read it. The importance lies in the fact that such a search for a "push button therapy" of schizophrenia has been started and is not likely to stop: others have already taken up this approach (*EEG Clinical Neurophysiol.*, Vol. 6, November 1954, pages 702-706). No matter what this reviewer or others think of such work, it is on its way.

Let us hope that anyone who tries such procedures will become more skilled technically, more sophisticated scientifically, more aware of what needs to be done with animals before working on humans, and, before using some other person, will contemplate more intensely and carefully what he would want done and what he would want to know before he had it done on himself as a subject.

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