

Book Reviews

Speech and Brain-Mechanisms. Wilder Penfield and Lamar Roberts. Princeton University Press, Princeton, N.J., 1959. xiii + 286 pp. Illus. \$6.

Among distinctions that differentiate man from his fellow creatures, probably the most spectacular and certainly the most important in relation to man's capacity to accumulate and benefit from knowledge is that of language and speech. This monograph by Wilder Penfield and Lamar Roberts represents the most substantial body of data and plausible conceptual contributions yet available for understanding the internal brain mechanisms relating to speech and language.

In many respects the book is more than a contribution of these two authors, as they freely acknowledge. This is evident not only from the contributions of persons who helped directly with the materials of the book itself but, in an even more cogent sense, from the contributions of Herbert H. Jasper, neurophysiologist, who has made a particular contribution to the authors' conceptions of thalamocortical functional relations, mechanisms of epilepsy, and other problems; Preston Robb, neurologist, who collaborated with Penfield in earlier studies concerning language and speech mechanisms; and Brenda Milner, psychologist, who collaborated in studies of perceptual and memory mechanisms. All of these individuals are part of the dedicated and expert staff of the Montreal Neurological Institute. Another contributor is Joseph Klingler, professor at the University of Basel, who prepared for this book a series of anatomical demonstrations which display advantageously the fiber connections linking cortex and thalamus. Eleanor Sweezey has made useful companion drawings of these dissections.

Speech and Brain-Mechanisms is a triumph in terms of its effective revelation of very complex and only slightly understood brain mechanisms in a form suitable for a general as well as a professional audience. The general conclusions of the monograph were given by Penfield in the Vanuxem Lectures at Princeton in 1956. Both authors are acutely aware of their opportunity to explain these fascinating and important observations and conclusions to as wide an audi-

ence as possible. Patients, shielded from pain by local anesthesia and having large areas of their brain exposed for electrical recording and stimulation, participate actively in the operative experience. They contribute subjective as well as objective evidence which is essential for an identification of sensory and motor fields. More particularly for the development of this study, they respond to command by counting or speaking while various local regions of the brain are explored with a weakly exciting electrical current that may interrupt their speech, interfere with their ability to match concepts with language, and evoke other alterations in the stream and content of consciousness, experience, and performance.

The patients were operated on for therapeutic reasons usually related to cortical atrophy associated with epilepsy. Brain-mapping was performed to supplement other diagnostic procedures for localization of the epileptic focus, to identify within the exposed field the primary motor and sensory projection areas, and to reveal as much as possible about the extent and character of speech areas. Of course, a thorough appraisal of speech capabilities was made prior to the surgical intervention and during the course of recovery. It is interesting to note that aphasia, when it occurred post-operatively, was only transient, except in the case of five patients all of whom continued to have seizures. Transient post-operative aphasia may appear a few days after the operation. The authors refer to this as "neuroparalytic edema," although they point out that it is not always paralytic but may be associated with local seizure activity, and that the time course is unusual for edema.

Evidence derived from stimulation and cortical excision resulted in the identification of three large cortical speech areas within the dominant hemisphere, exclusive of the central sensorimotor region. The largest speech area is located midway between the parietal, occipital, and temporal regions and is considered to be the most essential of the three. A second speech area lies in front of the motor face region, the classical Broca's area; this is definitely dispensable in some patients. The third, a superior or supplementary motor area, lies mainly on the upper part of the

medial surface of the dominant hemisphere, just in front of the motor region. This most dispensable region is one in which Penfield had previously discovered other motor functions. The sensorimotor area surrounding the central sulcus is actually contiguous with each of these three speech areas and itself plays an essential role in the articulation of speech. In contrast with the other speech areas, however, it has nearly equivalent representation in the nondominant hemisphere, and on this account the authors do not depict the sensorimotor cortex in their illustrations of localization of speech functions.

Other parts of the left hemisphere—primarily the frontal and occipital poles—have been stimulated without affecting speech. However, the number of stimulations was not sufficient to be statistically significant. A few cortical excisions which lay predominantly, if not entirely, outside the major speech areas and yet were followed by transient aphasia have been reported. "It seems, as [Huglings] Jackson stated, that any acute lesion to any gross part of the left hemisphere will produce some disturbance in speech. It should be mentioned that this includes disease of the anterior and posterior cerebral arteries as well as of the middle cerebral." Despite decades of continuing conscientious effort, the authors are careful to point out that they have relatively little knowledge of the effects that might be obtained from stimulating gray matter hidden within the folds of cortical sulci but can only assume "that the convolutions have the same function deep in the fissures as they do on the convexity."

More than 20 years ago Penfield came to the realization that "the indispensable substratum of consciousness lies outside the cerebral cortex . . . not in the new brain but in the old." In 1946, he noted that this "high level" of integration was located, not in the frontal lobe as Jackson had suggested, but in the upper end of the brain stem, which Penfield later designated a "centrencephalic system"—a system which includes all those areas of subcortical gray matter (together with their connecting tracts) which serve the purposes of intra- and interhemispherical integration, but from which, he thinks, the corpus striatum should probably be excluded.

The most conjectural aspects of the authors' interpretations relate to their suggestions pertaining to the relationships between cortical, thalamic, and brain stem speech areas. They do convey a convincing notion of preponderantly vertical systems operating in some kind of functional transaction with one another. Each cortical field is likened to a platform for the upward arrival and downward departure of impulses—a platform which permits the sorting out and reorganizing of impulses. Each per-

formance within the cortex seems to be more dependent for functional integrity upon its subcortical relations than upon its cortical connections with neighboring fields. The "cortical detours" provide an "increased allotment of space" to each of several subcortical functional systems.

Neocortical areas yield relatively objective, disinterested, internally perceived experiences, while those relating to the phylogenetically older systems evoke more personalized and self-involved subjective experiences. Thus, the temporal lobe and occasionally the insula may yield, on stimulation, "experiential hallucinations or interpretive illusions." Stimulation of the amygdaloid complex yields psychomotor confusion, which is followed by amnesia. The hippocampus (according to Milner and Penfield) seems to be the repository of neuronal mechanisms that preserve "the stream of consciousness" or, at least, play an important role in the mechanisms of reactivation of such a record of consciousness. It is interesting to note that the commonest evoked *emotional* response is fear, and that there are no reports of evoked pain, taste, or smell.

Speech representation appears to be largely restricted to one hemisphere, usually the left. "If the cases with injury in early life are excluded, there is no difference in incidence of aphasia after operation on the left hemisphere between the left- and right-handed." Even though the patient is left-handed, with weakness of the right hand from his early years, aphasia may follow operation on the left hemisphere. The authors depend initially upon Wada's (1949) sodium amytal test for determining which hemisphere subserves speech.

The last chapter is an interesting departure from the rest of the book and reflects the senior author's abiding concern with the way in which language is initially learned and the instructive implications of this concern as applied to the social problem of teaching supplementary languages expeditiously and effectively.

As compared with previous clinical and physiological observations concerning the central nervous mechanisms relating to speech, the contributions of Penfield and Roberts are monumental. The authors have made their account even more fascinating and moving through their obvious sensitivity to each patient's individuality and welfare and to the ethical problems involved in the physicians' invasion of the patient's brain-mind. This study clearly required a skilled and dedicated team of experts; it is gratifying that they were also thoroughly humane.

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Theory of Psychoanalytic Technique.

Menninger Clinic Monograph Series, No. 12. Karl Menninger. Basic Books, New York, 1958. xiii + 206 pp. Illus. + plates. \$4.75.

Karl Menninger is an accomplished writer and an experienced psychoanalyst; his book is a most readable didactic presentation of the traditional concepts of psychoanalytic therapy. The author stresses that this is a book on the theory of psychoanalytic treatment, but the assets of the book lie more in his practical recommendations and vivid descriptions of the fundamental psychodynamic phenomena of the treatment—such as regressive transference, countertransference, resistance, and the analyst's interventions. These psychodynamic phenomena are colorfully described, but they are not knit together tightly into a fully convincing theoretical model. As a whole, the author follows the traditional views, although some controversial issues are briefly referred to. The central significance of the transference phenomenon is convincingly stated, and its regressive nature is concretely demonstrated. The author's main emphasis is placed on the frustrating nature of the therapeutic experience which results from the fact that the therapist with his detached, objective, and relatively silent behavior does not satisfy the patient's infantile cravings, which, as the therapy goes on, become more and more infantile. As a result of these frustrations the patient regresses to earlier and earlier modes of feeling and reacting. A schematized regression scale is presented, in which the author follows Sandor Rado's diagram.

The crucial issue of psychoanalytic treatment remains essentially unanswered—namely, why, after a certain period of regression, when a point is reached, the patient turns around and progresses to more adequate forms of organization of his impulses, feelings, and object relations. The author is frank in admitting that his theoretical framework cannot provide a cogent answer to this question. This impasse is the result of his basic scheme, which does not correspond accurately to the actual psychological processes during treatment. Particularly, the fact is overlooked that from the very beginning of treatment, and coincident with the regressive process, continuous, spontaneous, integrative efforts are present which are continuously supported by the therapist's interventions. Regression and integration are simultaneously going on during the whole of the treatment, although the distribution of these processes may differ in the different phases of the treatment.

Perhaps the weakest spot of the theoretical model offered by Menninger is that he does not scrutinize sufficiently

the psychodynamic meaning of the term *regression*. A most important, but rather late, contribution of Freud's consisted of discriminating between the two kinds of regression. Originally, by *regression* Freud meant a return to periods of personality organization that have proved satisfactory in the past—a kind of retreat, into a happier past, from difficulties, conflicts, and traumatic experiences which have arisen at some point of mental and physical growth, usually during the early years of family life. Later he introduced another form of "regression"—the return to unsettled traumatic experiences. The simplest examples are dreams in which the dreamer conjures up and reexperiences overwhelming situations of the past. Freud explained this type of regressive phenomena as the ego's effort for subsequent mastery of an unresolved overwhelming experience. This type of return has a definite therapeutic significance. It is the self-curative effort of the "psychic apparatus" to reduce the excessive and never-resolved excitations caused by the traumatic event. Many of the regressive phenomena during psychoanalysis are of this nature, and they have a great therapeutic value. In fact, without them the therapeutic effect of psychoanalysis cannot be explained. Regression in the sense of escape to earlier, relatively satisfactory phases of development can be considered as resistance, and it has anything but a therapeutic value. It may have, however, great research value, giving insight into the earliest modes of feeling, thinking, and behavior.

The other type of regression is highly therapeutic. The patient reexperiences some of his old, unresolved-conflict experiences during treatment, but this re-experiencing takes place under more favorable circumstances. Not only are these revived conflicts of lesser intensity than the original ones but the adult ego is more capable of facing these conflicts, which originally the child's ego could not resolve. Moreover, this re-experiencing of old conflicts takes place in a different framework. In place of the original persons, an objective, helpful, and emotionally uninvolved therapist is now the object of the patient's predetermined reactions. These reaction patterns were responses to the old family situations and do not fit the therapeutic situation. This has a corrective value. This discrepancy challenges the ego, whose basic function is to adjust to a given situation, to find new and more adequate reaction patterns. These are the concepts which readily explain the therapeutic value of the psychoanalytic process.

Menninger gives a very vivid description of the emotional processes which take place during the treatment and also gives an excellent presentation of different types of intervention by the analyst.