large-scale highway, post route, topographic quadrangle or miscellaneous map for each county was measured and adjusted to the county area totals. A basic contribution to the precision of area measurement is provided by adequate definitions of land and water and an objective system for establishing the outer limits of the United States in terms of readily duplicated criteria. The work on this project was initiated by and carried forward under the supervision of Clarence E. Batschelet and Malcolm J. Proudfoot, chief and assistant chief of the Division of Geography.

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SCIENTIFIC BOOKS

THE BASAL GANGLIA

The Diseases of the Basal Ganglia. Volume XXI of the Proceedings of the Association for Research in Nervous and Mental Disease; December 20 and 21, 1940, New York. 719 pp. Baltimore: Williams and Wilkins Company. 1942. $10.00.

THE year 1940 was a strategic time to hold a symposium on diseases of the basal ganglia, to bring to the attention of clinicians and physiologists that now at last this refractory field is beginning to yield to repeated attack. The volume issued by the Association for Research in Nervous and Mental Disease contains neither sweeping new revelations, nor the clear picture which may finally be put together out of the studies of many investigators working from different points of view. It does, however, contain new evidence and interpretations, both derived from, and leading to new methods of treatment. And already these are beginning to shape into a new understanding.

The nineteen papers which constituted the symposium vary greatly in length and quality, and unfortunately not all of them are significant as printed, whatever their significance in practice may be. In this medley a variety of points of view is represented. Read consecutively, there emerges a clear idea of the directions of development in the field, and also of the impediments; especially preconceptions, and the too facile use of ill-defined terms. There is probably no other field of organic neurology which is so handicapped by lack of agreement on the content of concepts and on the definition of terms.

Although the chapters are not grouped in the book, the symposium seems to have been organized in six parts: anatomy, physiology, pathology, both anatomical and physiological, non-surgical treatment and surgical treatment, with a lively historical introduction to the whole. The anatomical section runs true to form in concreteness and detail of evidence on a number of points. It is especially noteworthy, however, for Papez enlightened presentation of current concepts of neural organization of motor function in the brain stem, illustrating in this the slow molding of thought in response to painstaking anatomical analysis.

In striking contrast is the physiological section, in which concepts impinge with the still unchallenged authority of yesterday's successful experiment. Considering the physiologist's long defeat in the field, unequivocal positive results such as are presented in three of these four papers are cause for rejoicing, even though the evidence is still far from creating a picture of the working of the basal ganglia. The last of these papers, by Dusser de Barenne, Garol and McCulloch, is especially significant as a new departure in experimental attack.

Pathological anatomy has hitherto been the most rewarded field of investigation of basal ganglion disease, and perhaps not much new should be expected. It is gratifying, therefore, to find in Alexander's paper both new evidence on and an interpretation of *Status marmoratus* Striati, and a physiologically oriented reconsideration of the time factor in the development of basal ganglion syndromes.

As to pathological physiology: Goodhart's brief commentary, which accompanied a motion picture exhibition at the symposium, affects me like the account of the fine party which I missed. The film was to have been made available for teaching purposes, and should be invaluable for that, especially if it is a talking film. Hoefer's paper, also on pathological physiology, applies modern electro-physiological technique to the analysis of muscle function in dykinesias, both of basal ganglion origin and others, with results that should exact clarification of concepts and of terminology.

Non-surgical treatment of "basal ganglion disease" has been disappointing, and the section dealing with it corresponds. Nevertheless, the papers of Phelps and of Carlson, and the discussion following, raise questions which are here and there suggested in the rest of the volume, but not clearly formulated. The personal and social aspects of these disorders will undoubtedly present problems long after their pathological physiology is reasonably well understood. The unexplored direction which I feel most strongly, looking back on the volume as a whole, is the emotional and psychic; the psychosomatic relationship. Throughout the clinico-pathological and clinical and

even the physical and anatomical papers evidences of this intrude, as it were, in many ways.

The section on surgical treatment is unquestionably the most exciting in the volume. The dramatic quality of successful surgery, especially when novel, heightens this effect, but it is based on sounder considerations. As a side issue, surgery on humans, coupled with careful pre- and post-operative study, performs experiments which the physiologist has not yet duplicated. Two of the four papers in this section, those of Bucy and of Meyers, are physiological studies in this vein. However, the emphasis and main interest in all four papers is therapeutic. Klemme's paper contributes little, but the other three, culminating in Putnam's smooth presentation and evaluation of his own experience, leave one with the reasonable expectation that surgical attack, still largely in the experimental stage, will shortly lead to standardized procedures widely applicable to the relief of "basal ganglion disease."

Reviewing the volume as a whole, and as a research publication, it seems to have balanced adequately the requirements of presenting technical research on the one hand, and basic research on the other. In both these fields its largest service to the general reader will be to break down the isolation in which basal ganglion disease and function has hitherto been regarded, and to emphasize the coordinated nature of motor action, whether healthy or diseased. Especially does this volume dispense with the dichotomy between "the old motor system and the new"; basal ganglia and cortex. Yet only as the directions indicated in this volume are more fully explored in clinic and laboratory, may we expect to understand the contribution of the basal ganglia to total motor function. For unquestionably this book marks a beginning, not an end, of a phase in research.

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UNCONSCIOUSNESS

Unconsciousness. By JAMES GRIER MILLER, Society of Fellows, Harvard University. ix + 329 pp. New York: John Wiley and Sons, Inc. 1942.

"THIS book," as the author says in his preface, "attempts to distinguish the various meanings of the word *unconscious* which have been used, and to describe and differentiate carefully the diverse sorts of human behavior which have been included under this term." No fewer than 16 meanings are distinguished, some of them being, as applied to the individual said to be unconscious:

Unresponsive to stimulation, either to a particular stimulus or to all (or most) of the stimuli present.

Undiscriminating, not responding differently to differences of stimulation.

Verbally unresponsive, unable to communicate any evidence of discrimination.

Inattentive to a stimulus, responding only automatically.

Acting involuntarily.

Lacking insight into one's motives for an act or reasons for a conclusion.

Unable to remember what one has experienced.

Unable to remember desires and ideas that have been "repressed" from consciousness because the individual is afraid or ashamed of them (the Freudian meaning).

Unaware of a given stimulus or act—the generic meaning for those psychologists who are willing to accept introspective evidence, as the first three definitions given above are those acceptable to the behavioristic psychologists.

The phenomena indicated by each of the definitions are reviewed at some length with a view to appraising the amount of reality embodied in each definition, and finally a tentative approach is made toward synthesis.

The body of the book contains a large number of interesting discussions. For example, there is the neurological question whether consciousness is peculiar to the cerebral cortex or any particular part of it, to the hypothalamus or to the nervous system or organism as a whole. There seem to be higher and lower levels of conscious behavior, and "it is best to picture . . . consciousness (awareness) as migrating from place to place, being present in whatever region of the nervous system is at that time the location of the highest integration of the total behavior."

As to remembering and forgetting, the question is considered whether there is such a thing as "simple forgetting," an atrophy through disuse. Without dealing quite fairly with the evidence—as it seems to the present reviewer—the author rejects simple forgetting in favor of such factors as interference, repression and the reorganization of memory traces by an unconscious dynamic process.

The author's method, in general, is to bring together the problems and observations of the psychiatrists and clinical psychologists and the experiments of the laboratory psychologists offering some light on these problems. These two types of psychology have gone on side by side for many years without much contact with each other, though the desire for such contact has been expressed from time to time. The author's freedom from partisan heat, combined with his clear and fearless presentation of the issues, open the way for frank discussion with the hope of fruitful investigation of this kind of problem.

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