

Book Reviews

The Ustilaginales of the World. Contrib. No. 176, Dept. of Botany. George Lorenzo Zundel. Pennsylvania State Univ., State College, Pa., 1953. 410 pp. \$3.50.

In this book are descriptions of more than 1000 species in 30 genera of the two families of smut fungi. The genera within the families and the species within the genera are arranged alphabetically. For each species are given: the scientific name and author, synonyms and their authors, descriptions of the sorus and chlamydospores, the type host and locality, and the host range, both taxonomically and geographically. None of the fungi are illustrated. Following the text is an index of species of hosts with the species of smut fungi attacking each, and an index of synonyms and species of smut fungi mentioned in places other than their alphabetical order in the text. The text proper is preceded by an introduction, historical review, general description of the Ustilaginales, a selection of 52 references on the group, and a key to the genera. It should be a useful manual, especially for those specialists in the group who work mostly with herbarium material.

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Epilepsy and the Functional Anatomy of the Human Brain. Wilder Penfield and Herbert Jasper. Little, Brown, Boston, 1954. 896 pp. Illus. + plates. \$16.00.

This magnificent volume brings together into one integrated account much of the recent work dealing with brain structure and function, particularly as they are revealed in the various forms of epilepsy. The authors are outstanding experts in their fields—Dr. Penfield as neurosurgeon and Dr. Jasper as neurophysiologist. In a unique manner, they have woven together the contributions of their two disciplines, so that they illuminate the basic physiology of the brain as they describe, in intimate detail, the manifestations of epilepsy, its clinical management, and its operative alleviation or cure. The argument is supported by more than 200 case reports, more than 300 illustrations, and a bibliography of 700 citations.

The first five chapters are largely given over to neurophysiological descriptions. A wealth of clinical material has made possible the electric stimulation of the exposed cortex and of many deeper structures in conscious human subjects. Notable features of this discussion are

1) The preparation of maps of the "supplementary motor areas" that lie on the medial surface of each cerebral hemisphere, just anterior to the upper end of the sensorimotor strip. Four centers for vocalization were described, two in the classical sensorimotor areas, two in the supplementary motor areas.

2) The mapping of the second somatic sensory areas which lie on the upper bank of the Sylvian fissure, below the primary sensorimotor complex. The heightened activity characteristic of epilepsy may originate in these second sensory areas as well as in the primary areas.

3) Failure to demonstrate the existence of the so-called "suppressor strips" on the lateral surface of the hemispheres. "One must conclude, therefore, that there is inadequate evidence for the existence of specific inhibitory areas in the cerebral cortex. Motor inhibition which is occasionally observed is obtained from areas of cortex in which the elaboration of its coordinate function may require an element of inhibition, but no area seems to have its function restricted to that of inhibition" (p. 234).

4) Evidence that the temporal lobes may be specialized areas for memory.

The authors develop a new conception of the seat of consciousness in the human brain. According to their view, consciousness does not reside primarily in the frontal lobes, as Hughlings Jackson taught. They locate consciousness in the "centrencephalic system," an area in the upper brain stem which includes thalamus, hypothalamus, and adjacent structures. It is conceived as being "highest level" in the functional, if not in the anatomic, sense. The centrencephalic system "has a symmetrical functional relationship with the cortex of the two cerebral hemispheres," its thalamic nuclei being connected by a diffuse projection system containing both corticopetal and corticofugal fibers. Posteriorly, this system is intimately connected with the reticular formation of the brain stem, forming with it a central core of nervous tissue with both motor and sensory components. This system must be distinguished from the longer and better-known specific projection systems, but one of its functions is the coordination of the activities of these specific projections.

The concept of the primacy of the centrencephalic system in the production of consciousness runs like a silver thread of continuity through many chapters. The view is thoroughly developed in Chapter XII. Its departure from orthodox thinking is portrayed in the following sentences (p. 43):

In a sense, it might be said that experimentalists have left clinicians and psychologists stranded upon the vast shores of the cerebral cortex with no chart or compass to guide them. The initial assumption of experimentalist and clinician alike was that within the cerebral cortex alone lay the mechanisms of thought and voluntary action. But study of the epilepsies and of the experiments wrought by disease and injury upon the brain of man is gradually demonstrating the fact that the *highest level of neuronal integration* must be sought in the diencephalon and midbrain.

The types of epilepsy known as *petit mal* and *grand*