observatory at Sidmouth, but he was too old for much active participation. He died in 1920.

This brief account in no way exhausts the catalog of Lockyer's diverse interests. He anticipated recent developments in his interest in the astronomical orientation of ancient temples. He was mightily concerned with the public impact of science and was active both in the British Association for the Advancement of Science and the British Science Guild. Such problems as scientific military preparedness, education in the Navy, grants for the National Physical Laboratory, the pollution of rivers, postage on learned journals, standardization of time, agricultural research, research fellowships, and the election of women to membership of learned societies were all urged, mainly at his instance, upon official quarters.

All this made him friends and enemies, both warm and numerous, and Meadows does Lockyer and us a great service in describing the vivid personality of his subject and the immense variety of his concerns in science and public life. As a vignette of intellectual and political life in Victorian London, the book is outstanding.

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Human Data for Brain Models

Aphasia, Apraxia and Agnosia. Clinical and Theoretical Aspects. JASON W. BROWN. Thomas, Springfield, Ill., 1972. x, 310 pp., illus. $14.50.

Patients who have incurred focal damage to the phylogenetically newest portion of the brain, the cerebrum, experience apparently isolated difficulties in certain aspects of thinking, perceiving, verbalizing, or performing skilled acts. Impairment of the control systems responsible for our characteristically human behavior may result in these deficits. They are among the most studied but least understood of natural phenomena. They are much studied in the hope that to understand them will be to comprehend the principles according to which the human cerebrum is organized. These diverse phenomena are not intrinsically unintelligible. However, when investigators have formulated questions to ask their subjects, they have used restrictive models of brain organization, which either admit only the simplest of organizing principles (information flow from point to point) or overreact to this simplicity by asserting such invincible complexity that analysis seems virtually impossible.

These reservations naturally apply to much of the material that Jason Brown reviews in his lucid and tightly organized book, and he is well aware of this. The many reported cases that he quotes were studied from quite different perspectives and one suspects that information inimical to each case reporter's theoretical orientation may be skated over. This is especially likely because such cases are rarely available for study by more than one group, and replication is a dubious concept when no two brain-damaged patients are identical. Most of these studies were inspired by a simple "switchboard" model of information flow, which has proved remarkably hardy in the face of a century of justifiable castigation. But the switchboard model bypasses analysis at the level of function and glibly equates each overt behavioral deficit with a presumed brain operation, each with its supposedly definite locus and with discrete communication pathways to other loci.

Brown fundamentally departs from this model in the direction of a less restrictive approach which makes it possible to apply to neuropsychological problems the methodology and insights of contemporary cognitive psychology, from which it has formerly been well insulated. He does not think in terms of a sequential progression from input to output, with different deficits depending on where the sequence is blocked. Instead, he thinks in terms of a dimension of "depth," ranging from the superficial-specific input and output functions to the deepest and more general semantic processes. At each level both input and output functions will be impaired. Thus at the superficial level of a language disorder, the impairment is phonological for input, articulatory for output. At a deeper level it compromises the word as a lexical unit, so that words are wrongly interpreted and wrong words are evoked in speech. He uses his "microgenetic" organizing principle to make some strikingly successful explanations of the various components of symptom complexes. He does not believe the symptoms are additive but rather that they are various aspects of one deranged process at a particular stage of its realization; transitions from "syndrome" to "syndrome" in recovery (lessening "severity") are changes in the microgenetic stage of the damaged process. The approach, applied clearly and without the vague jargon that encumbers some of its previous proponents, helps the student of cerebral symptomatology and has heuristic value to the investigator in organizing his thoughts: the predictions are many and testable.

Models of the brain are not mutually exclusive. The switchboard model and the microgenetic one can each contribute understanding of those aspects of brain function that utilize their principles. In addition to those Brown discusses, Jackson's principle of hierarchically superimposed cortical systems certainly elucidates a further set of phenomena. The Sherringtonian approach that deals in inhibitory interactions between competing responses is particularly well adapted to serve as a neural model for the behavioral interactions subsumed under the term "selective attention," in which a limited amount of overall "capacity" is variously distributed between concurrent activities.

All these are, and more will be, grist to the mill of the opportunistic investigator, and the brain is complex enough to accommodate the ambitions of all model makers. As for the data needed for the making of this model, there exists no single source as accurate, concise, detached, and intelligently put together as that now presented by Brown.

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Reproductive Endocrinology

Gonadotropins. A symposium, New York, June 1971. BRIJ B. SAXENA, CARL G. BELING, and HORTENSE M. GANDY, Eds. Wiley-Interscience, New York, 1972. xxxii, 800 pp., illus. $32.50.

A symposium with the objective of integrating recent research on gonadotropins as they affect human reproduction was organized to commemorate the 200th anniversary of the Society of the New York Hospital in June 1971. The resulting symposium volume consists of 58 separate research reports organized into nine sections spanning broad areas such as biochemistry,