

are numbers.

Bibliophiles will recoil from this manual as the page size, paper, and covers are odd, offensive, or both. The absence of time calibration in the records may also cause some regret, though it is not really necessary for the pattern recognition involved in this eyeball kind of analysis.

In summary, this work extends the objectification of sleep behavior to the newborn period and clearly exposes many problems that remain to be solved by future work. As a state-of-the-art guide to the perplexed, this manual will be welcomed by electroencephalographers, pediatric neurologists, and developmental psychologists, as well as by students of sleep.

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Explorers of the brain. — L. A. Stevens. (A. A. Knopf, New York, 1971, 348 p., \$ 7.95).

Those of us who have made an understanding of brain function a life-time pursuit should be grateful to Leonard Stevens for providing a remarkably thorough and detailed account of the tortuous process that led to our current state of knowledge. Faithfully recorded under eye-catching chapter headings such as "From Spirits to Electricity", "Life without Mind", "The Last of the Galvanometers", "Secrets in a Sea of Detail", "Electrical Maps of the Nervous System", and "The Search for the Engram" are the observations, speculations, and conclusions that shaped the thinking of generation upon generation of scientists and clinicians. The false steps as well as the gainful ones are set forth. The historical controversies are brought into sharp focus with proponent and opponent being clearly identified. And in so doing, the author brings alive a subject that might otherwise be dull and obscure.

Mr. Stevens' background makes him well suited to his task. He has had extensive experience in making scientific and technological matters palatable to a general audience. Though not a scientist himself, he is clearly at home among them, preparation for the present book having included contacting and interviewing many of the most active contemporary workers.

The author's narrative touches upon some of the most recent developments in brain physiology. Here the reportorial style is especially effective, making the reader a party to scientific history in the making. A minor overemphasis upon the startling item in this section can be forgiven readily because of the general soundness of the approach.

It is hoped that this book will be displayed prominently on every "current non-fiction" shelf but it is likely to be sought out even when placed in the back stacks. Many will find it a valued addition to their own libraries.

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Languages of the brain. — K. H. Pribram (Prentice-Hall, Englewood Cliffs, N.J., 1971, 432 p., \$9.50).

As suggested by its title, this is a poetic book. This fact is responsible both for its major strengths and for its major weaknesses. Complex ideas are creatively juxtaposed and compressed, deftly elaborated by allusion and well chosen examples. Poetry, however, may legitimately be developed unfettered by fact, where science is more constrained. In his striving to bridge the great gulf between neurophysiology and behavior, the author has in places soared freely into speculation. He and his fellow neuroscientists can readily recognize these points of poetic departure. The less advantaged readers, to whom primarily this book is addressed, may not so easily perceive when they have left the ground.

The 20 chapters of the book are divided into 4 sections: (1) basic neurophysiology; (2) psychological processes, perception and emotion; (3) motor mechanisms and reinforcement; (4) communicative processes, signs, symbols, speech and thought. It is proposed that graded responses, *i.e.*, postsynaptic potentials (PSPs) and DC potentials, are the critical phenomena for the integrative processes underlying most neural action of behavioral or psychological importance. Such considerations lead the author into the romantic extrapolation that mnemonic mechanisms are analogous to those of holograms, the EEG somehow representing waves propagating through an ethereal neuropil.

In historical perspective one can here perceive the ghost of the "reticular" theory of neural action, returned in a new form. The contrary view, "the neuron doctrine", around which 20th century neuroscience has grown, scarcely requires defense. The specific points of controversy, however, need more precise identification than they have received in the book. No one denies the integrative role of PSPs in controlling the action of the neuron in which they are generated. This has been the major thrust of neurophysiology for the past 20 years. It is an entirely different matter, however, to propose that the PSPs in one neuron have significant influence upon its neighbors. Rather, it is probable that the chemical step in synaptic transmission has evolved precisely to curtail such non-specific "crosstalk"; and in those cases where electrotonic coupling is prominent there is both morphological specialization and curtailment of integrative scale (Bennett; Pappas; Baker and Llinás) or pathological consequences (Rusinov and Ezrokhi). The organization of the neocortex into modality-specific columns of neurons (Mountcastle; Hubel and Wiesel; Asanuma) is not likely to be achieved by non-specific gradients of electrical fields, nor to offer any advantage were such fields to play a prominent integrative role. Indeed, from what is known, it might be supposed that cortical analysis proceeds despite interfering field potentials rather than by means of them, and this has been the conclusion reached by the few experiments designed specifically to test this point (*e.g.*, Lashley, Chow and Semmes; Sperry, Miner and Myers).

Thus, the proposal that diffuse effects of PSPs and DC gradients might account for the still mysterious and exquisite subtlety of cortical processes needs something more than mere analogy with holograms to support it. Even the analogy is far fetched since the remarkable properties of holograms are wholly dependent upon two features which