Book Reviews

ELECTROENCEPHALOGRAPHY IN DRUG RESEARCH. Edited by Werner M. Herrmann. Published by Butterworths. 608 pages.

This volume contains the proceedings of the symposium "E.E.G. in Drug Research" held in Berlin, June 27-29, 1980. The symposium was held under the auspices of the Institute for Drugs of the German Federal Health Office and the International Pharmaco-EEG Group.

Neuroscientists have been aware of qualitative effects of various drugs (cocaine, barbiturates, scopolamine, etc.) on the E.E.G. since Hans Berger's first description in the 1930's. His descriptions were based on visual inspection of the analog signal. Interest in more quantitative approaches to analysis of E.E.G. data developed but had to await the development of modern, economically feasible computerized reduction of E.E.G. data. The multiple authors of this symposium refer to this attempt at quantitation as "pharmaco-EEG". The symposium attempted to outline basic standards for the use of E.E.G. data in assessing the effects of drugs on the central nervous system. This list of guidelines and the rationale for these guidelines constitutes the preamable and first chapter of this book.

Most of the presentations (which constitute the individual chapters) utilize computerized analysis of E.E.G. data. The analog E.E.G. signal for these data has been collected from two to over forty separate scalp recording sites. Some studies examine simple averaged evoked potentials from a limited array of scalp electrodes. Others attempt a toposcopic assessment of various evoked potential components. Many of the papers are based on digitization of the analog E.E.G. signal and derivation of power spectral data using a fast Fourier transform for initial data reduction. The spectrum is then divided into "classical" (alpha, delta, theta, beta) frequency bands and the spectra in these bands is viewed as a probability density distribution. Relative and absolute power of these bands and their variabilities following drug administration are correlated and profiles or "fingerprints" for various classes of drugs and their dose-response-time relationships studies. (Drugs studied include tranquillizers, hypnotics, Enkephalins, as well as antidepressant and antiepileptic preparations.) The conclusions based on these E.E.G. statistical manipulations should be viewed with skepticism since complex changes within these frequency bands are difficult to interpret in a meaningful way. In other words the physiological and behavioral correlates of these changes are tenuous at best.

Some studies also utilize toposcopic and temporal profiles of changes in the various parameters with drug administration. A variety of statistical measures are utilized to massage the derived E.E.G. data. These include linear autoregressive modelling of the spectra and identifying spectral peaks by computation from regression coefficients.

A number of the studies reported, correlate computerized E.E.G. data or indexes derived from this data with positron emission tomography data, regional cerebral blood flow data, various measures of vigilence and physiological profiles.

Most of the reported studies in this book are based on human data although some, such as the studies of Enkephalins and the antiepileptic effects of benzodiazepine derivatives following cortical application of penicillin are in animals.

A few chapters in the book are concerned with analysis of analog E.E.G. data primarily, relating to sleep studies. One chapter in particular deals with the problems of quantitation of sleep data using the limited number of scalp leads classically applied. The difficulties in automated analysis data using this format are discussed but few solutions are proposed. There is also a section on the use of E.E.G. data in the evaluation of drugs utilized in dementia and the geriatric population.

Introductory remarks in this book suggest it embodies the "state of the art" using E.E.G. data for assessing the effects of drugs on the central nervous system. The diverse approaches to methods of data collection and analysis and their correlations with drug effects points to the need for a better understanding of the physiologic substrate of E.E.G. data before guidelines in this field can be established.

Several of the chapters in this book are written in a clear, concise manner. Many, unfortunately, are confusing by virtue of the complex and convoluted presentation of the methods and/or results. It is clear from reading the papers in this book that mathematical manipulation of E.E.G. data has reached a new peak but the meaning or clinical import of this data is often doubtful. For example, some studies reported claimed to use the E.E.G. data as an index of the therapeutic efficacy of various drugs. This may be partially true with drugs such as hypnotics and antiepileptic drugs but even in these cases requires a careful clinical correlation. Drugs affecting the central nervous system may be associated with E.E.G. changes but these E.E.G. changes are complex and often due to multiple factors including changes in vigilance, mood, personality, etc. Complex computerized E.E.G. data is often used to infer therapeutic efficacy of drugs but seldom is as suitable a parameter as objective clinical improvement measured by other means.

Overall, this book is an interesting volume and highlights the many problems inherent in analysing complex physiological data in a meaningful way.

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EPILEPSY: AN UPDATE ON RESEARCH AND THERAPY. Edited by G. Nistico, R. De Perri, H. Meindardi. Published by Alan R. Liss, Inc., New York. 381 pages.

Progress toward our understanding of the basic mechanisms of epilepsy is advancing at such a rapid pace and so many fronts that books such as this, containing short reviews and brief articles on recent results, are most valuable.

The first part of the book is devoted to several excellent contributions on such advances in several areas of the basic science of epilepsy. Included among these is a well written review by Massimo Avoli of McGill on whether epilepsy is a disorder of inhibition of exitation which includes some of his work relevant to this question.