Book Reviews

Neural Signals and Conscious Processes

Evoked Potentials in Psychology, Sensory Physiology and Clinical Medicine. D. REGAN. Wiley-Interscience, New York, 1972. xvi, 328 pp., illus. $15.95.

Evoked Brain Potentials in Psychiatry. CHARLES SHAGASS. Plenum, New York, 1972. xii, 274 pp., illus. $16.

Although electrical potentials associated with visual stimulation and with voluntary movements were recorded from the exposed cerebral cortex of experimental animals almost a century ago, only within the past two decades has it become possible, through the application of averaging techniques, to extract the neural signals linked in time to stimuli or to motor acts from the spontaneous electroencephalogram (EEG) recorded from the intact human scalp. The promise of a more specific insight into brain mechanisms than provided by the EEG, coupled with the ease of recording these "event related potentials" (ERP) with the special-purpose averaging computers which became widely available during the 1960's, prompted a resurgence of interest in human brain potentials among scientists and clinicians of widely varied background. The diverse interests and approaches of the psychiatrists, neurologists, electroencephalographers, psychologists, ophthalmologists, audiologists, computer scientists, and electronic engineers who contributed to the growth of the field generated a welter of experimental material which, although it touches upon many areas of substantial clinical and scientific significance, has little internal coherence and conceptual structure and raises many questions of fact and interpretation.

Regan and Shagass have each made a substantial effort to provide an overview and critical evaluation of human ERP studies. Since each book reflects the special interests and competence of its author, neither presents a comprehensive treatment of all aspects of the field. Nevertheless, the coverage of one complements that of the other to a surprising degree, and together they achieve a reasonably complete and detailed review of this disorderly body of experimental literature.

Regan has treated the ERP field in a thoughtful and analytic manner, and attempts to provide the reader with some indication of the relationship of human brain potential studies to basic neurophysiology and to other experimental and conceptual approaches to the analysis of sensory information processing. His commentary on almost 1000 citations is a tour de force of critical review, which must be read with care and in small doses, as each section comprises a compact and often trenchant analysis. Although some of his concerns and conclusions may not be entirely justified, future work can only be sharpened by his incisive critique of the design, execution, analysis, and interpretation of ERP experiments. Regan is also concerned with the clinical application of evoked potential techniques, especially to sensory testing. While one cannot question the likelihood that these methods will, when adequately refined and standardized in the appropriate clinical settings, provide a useful diagnostic tool in pediatric audiology and ophthalmology, the broader research horizons in psychobiology and abnormal psychology have not been fully explored.

Shagass, a biological psychiatrist, has devoted a major portion of his research to the quest for valid and reliable physiologic correlates of psychopathology and was a pioneer in the application of evoked potential methods to this problem. He presents a summary and evaluation of his own evoked potential investigations, along with a detailed review of the attempts by others to correlate ERP measures with psychological variables. The brief technical introduction would be of use mainly to the neophyte who requires a synopsis of instrumentation. His summary of the main characteristics of the ERP provides a useful description of the main classes of brain potentials disclosed by the averaging technique: the evoked responses to peripheral stimuli, the potentials associated with voluntary movement, long latency potentials which appear when stimuli achieve signal value, and the steady potential shifts related to expectancy or preparatory activity. The treatment of psychophysiologic correlations—with level of consciousness, attention, intelligence, personality, psychopathology, and effects of psychoactive drugs—is comprehensive and maintains a properly critical stance. Shagass concludes his review on a note of "cautious optimism" which stresses the "difficulties of applying evoked potential methods in a meaningful and valid way to psychiatric problems."

Unfortunately, his resolutely empiricist approach to psychophysiology prevents him from putting the finger on the basic flaws in much of this work. There are serious limitations in current psychiatric diagnostic methods and categories which compound the lack of articulation between the psychologic and psychiatric variables. There is a tendency to carry over into the ERP studies approaches which were employed in previous unsuccessful attempts to link the EEG with psychological constructs. There is little reason to suppose that arbitrarily selected ERP measures are likely to provide interpretable correlations with poorly defined psychological entities or clinical groups. Since there appear to be reliable but diagnostically unspecific alterations in some evoked potential measures among psychiatric patients, there is a great need to establish the specific functional significance of these electrophysiologic changes.

It is clear from recent ERP research that investigators in human neuropsychology are in possession of an increasingly potent method for charting the course of neural activity associated with perceptual, cognitive, and motor processes. This raises the distinct possibility that some of the physiologic concomitants of conscious experience can be identified and subjected to analysis—a circumstance which will have a considerable impact in psychology. A capability for direct observation of physiologic activity concurrent with experimentally manipulable aspects of experience may soon vitiate the behaviorist objection to the study of conscious processes. In addition to the theoretical impact of these new tools for probing the physiologic basis of mental activity, there are substantial practical implications for education and abnormal psychology. Recent work has disclosed brain potentials which arise from portions of the human cerebral cortex which are believed to subserve the most complex mental activities, including language. These "association cortex potentials" may provide a means for assessing the maturation and func-

tioning of these brain regions, both in normal children and in those with perceptual and cognitive dysfunction, such as developmental dyslexia. Physiologic methods for differentiating and analyzing the various forms and origins of mental subnormality and psychopathology would seem to be potential outgrowths of the analysis of these higher-order cerebral potentials. There is certainly no doubt that the possibilities for enhancing our understanding of the human brain through recording its electrical actions have barely begun to be exploited. For those who might find exciting and potentially rewarding opportunities for adding to our understanding of the neurological basis of human experience and behavior, these books provide a useful assessment of what has been done so far, as well as point to the vast areas of ignorance which remain to be explored.

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Irrelevance in the Lab

Drugs and the Public. NORMAN E. ZINBERG and JOHN A. ROBERTSON. Simon and Schuster, New York, 1972. 288 pp. Cloth, $8.95; paper, $2.95.

To the scientist who believes that conventional pharmacological research is the major route to knowledge about the human effects of the illicit drugs, this book will be unsettling. For those who firmly believe the criminal law is a necessary response to the illicit use of drugs, the authors—one a psychoanalyst, the other a lawyer—can only be viewed as new devils joining Professors Packer (*The Limits of the Criminal Sanction*), Kaplan (*Marijuana —The New Prohibition*), Grinspoon (*Marijuana Reconsidered*), and others in heresy.

Drugs and the Public is not a research report; it cites scientific evidence only illustratively. It is concerned mainly with how attitudes toward drugs and the institutional structure of the drug law function, that is, what purposes they serve, and what effects they have. The authors' method is one of interpretation and analysis. They conclude that existing public attitudes are functional but damaging and that the social cost of the product—the criminal law and its effects—is very high indeed.

Simultaneously critical, analytical, historical, and action-oriented, their essay ranges over broad territory, moving (sometimes too rapidly and occasionally erratically) from illustrations derived from interviews enhanced by psychoanalytic commentary to testable hypotheses (such as that psychedelic drug use is compatible with being of the television generation because television has taught new cognitive-sensory styles which make ego boundaries more permeable) to reasoning from temporal correlation (youthful hostility to the police occurs because of the marijuana law) to legal commentary to the advocacy of social policy on humane grounds and on economic grounds. If, in all of this, there be a beastie to berate, it is the National Institute of Mental Health, which is found wanting for giving priority to pharmacological rather than sociopsychopharmacological research. The accusation is gently made that NIMH has joined the press and the public in that unwarranted alarmism about drug use which, the authors hold, creates (certain) adverse drug reactions (through stigmatization and alienation). The reader who recognizes that NIMH bases its funding at least partly on peer review realizes that the system for selection of review committees and the processes whereby scientists develop their interests in and convictions about drugs are obscure and are, like other matters raised by Zinberg and Robertson, deserving of greater general understanding.

The authors ask, How much that is useful to social policy can we expect from scientific information as it is conventionally gathered in the drug field? They call traditional biological laboratory work "impeccable but irrelevant." Scientists ought to be spending more time thinking about person, set, and setting as determinants of drug response. (Pharmacologists used to call these variables "nonspecific," which is a sign of how little faith pharmacologists had—have?—in finding regularities there!) They also propose that it is time for a science of subjective states. (If that fine old introspectionist Titchener is listening in his grave, he will be applauding.) These issues are by no means minor. Defined by other workers in somewhat different ways, the general concerns of Zinberg and Robertson are already exerting pressure in current research on how drugs ought to be classified when the purpose is to anticipate the outcomes of personal and social styles of use rather than of medically controlled ones. Unlike some of their colleagues, Zinberg and Robertson do not counsel postponing the revision of classification schemes (as in the U.S. Dangerous Substances Act, the British Misuse of Drugs Bill, or the proposed U.N. [Vienna] Convention on Psychotropic Drugs)—and of the basic law of which they are a part—until further studies are made. To the contrary, they warn that the call for "more research" may be a stall for time that only serves the status quo.

Their proposal for reform in social policy is a dramatic one based on their convictions, convictions that embrace moral and economic considerations. After reviewing alternatives, they recommend licensing. "We need a system that permits drug use but does not encourage it." The system they put forth "is based on automobile operator's licensing and would apply to *all* drugs, not just marijuana." They propose that licensing be done provisionally and revised as evaluation shows the need. Then if bad outcomes from the licensed use of particular drugs are demonstrable over the years, those drugs could be withdrawn without becoming a "symbolic issue"—that is, without embroiling drug users in the kind of total conflict with conventional society that becomes a vicious circle. Zinberg and Robertson do not wish John Q. Citizen (whose identity they conceal by a pseudonym, "Mr. Fry," because they present intimate psychoanalytic data about him!) to suffer anguish, or to be pushed into revolutionizing the drug law without a full awareness of the issues and of how his own attitudes and feelings affect the drug scene as a whole. They prefer that there be an informed consensus on the need for a radical initiative, and their book is intended to contribute to that end.

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Barriers and Achievements

The Life of Benjamin Banneker. SILVIO A. BEDINI. Scribner, New York, 1972. xviii, 434 pp. + plates. $14.95.

Benjamin Banneker (1731–1806) impressed his contemporaries by accomplishments such as preparing an almanac and assisting Andrew Ellicott in the survey of Washington, D.C., without formal schooling and in spite of the barriers placed before any son and grandson of slaves. In the later years