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BOOK REVIEW

The Black Box is Gray

Handbook of Drug and Chemical Stimulation of the Brain. Behavioral, Pharmacological and Physiological Aspects. Robert D. Myers, Purdue University; Van Nostrand Reinhold Co., 450 West 33rd St., New York, N.Y. 10001, 1974, 759 pages including an Author and Subject Index, $37.50.

An excellent, comprehensive, and timely survey of the literature concerned with the direct action of drugs and other chemicals on the brain. The author covers the subject matter very well and except for a few possible oversights the book is an exhaustive review of all the published work in many specialized and diverse disciplines relevant to chemical stimulation of the brain. The author should be commended not only for initiating such a project but also for accomplishing alone what many would agree was a difficult and overwhelming task. Since the book is the first of its kind in this field, it will therefore be of considerable interest and importance to teachers, research workers and students in physiological psychology, physiology, pharmacology, and biochemistry.

The book is divided into thirteen chapters. The first chapter deals with the nature of chemical stimulation, chemical sensitivity, and chemical analysis of brain tissue. The concept of chemical receptor is discussed and the anatomical basis of chemical stimulation, major structures, and the pathways of the biogenic amines are described. Included under the rubric of general considerations are several interesting historical facts concerning the development of the field. For example, *Physiology and Behavior* was the leading source of articles from its inception in 1966 to 1972 and accounts for 8.4 percent of the relevant publications in the ten most commonly used journals and approximately 5 percent of the over 1400 publications cited in the volume. The Master Data Summary Tables which are included at the end of Chapters 3 through 12 are a very valuable feature of the book. The purpose of these tables is to provide an overall view of the chemicals which exert an effect when injected into various brain sites on the specific functions covered in each chapter; such as hormone release, eating, drinking, and temperature regulation. Dose, volume, species, general anesthetic, type of response and references are also included. The use and limitations of the tables are explained in the first chapter.

The second chapter describes in detail problems and methods for stimulating the brain with chemicals. These first two chapters provide a representative sample of the several hundred excellent line drawings and other illustrations which are utilized to clarify material throughout the volume. The theoretical concepts, laboratory techniques, and principles of drug action explained in these two chapters provide the foundation, which will be particularly useful to the beginning student, for understanding the myriad of factual material which follows.

Results of studies in which neurohumoral, hormonal, proposed transmitter substances, epileptogenic compounds, tranquilizers, anesthetic agents, alcohol, morphine, toxic metals, and many drugs are summarized in ten chapters. The material is organized in terms of major physiological and behavioral functions as follows: (1) Cardiovascular Control; respiratory control, gastrointestinal function, and mixed autonomic effects (2) Adrenal, Thyroid and Other Hormonal Systems; ACTH release and the hypothalamus, growth hormone release, and thyrotrophic hormone release and the hypothalamus (3) Reproductive Functions and Sexual Behavior; central estrogen receptors, progesterone receptors, androgen receptors, mechanism of gonadotropin release, central endocrine effects on sexual behavior, inhibition of sexual function, and biogenic amines in the hypothalamus (4) Temperature Regulation; neurohumoral control mechanisms and amines, ionic set point function, pyrogens and fever, and drug effects (5) Hunger and Feeding; hypothalamic hunger and satiety mechanisms, adrenergic receptors for feeding, cholinergic feeding, and inhibition of feeding (6) Thirst and Drinking; thirst receptors in the hypothalamus, cholinergic thirst system, adrenergic mechanism of drinking, and central blockade of drinking (7) Sleep and Arousal; monamines and sleep, acetylcholine and sleep, ionic balance and sleep, and drugs and arousal (8) Sensory and Motor Systems; modification of sensory input, gross motor function, tremor, seizures and epilepsy, and subcortical spreading depression (9) Emotional Behavior; hypothalamic mechanisms of emotion, limbic mechanisms in emotional behavior, killing behavior, tranquilizers and other drugs, and therapeutic application in the human (10) Learning and Memory; drive and reward mechanisms, cholinergic mechanisms and learning, hormones and learning, and memory mechanisms.

The final chapter is an epilogue which evolved gradually, according to the author, as the material in each section was considered. Anatomical uniqueness and the basis of anatomical diversity are discussed. Logical and technical difficulties in the conceptual development of a neurochemical code, neurohumoral coding, and the unequivocal identification of a neurotransmitter and the classification of other substances such as modulators, mediators, moderators and modifiers are presented. After a brief description of how a neurohumoral code might function, the author concludes the volume with the statement that "... the black box is gray."

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