FOREWORD

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This Conference on Brain Function and Learning is one of several on related topics which have been sponsored by the Brain Research Institute, University of California, Los Angeles, and the Office of Scientific Research, United States Air Force. The general plan in each instance has been to start with basic structural and functional considerations relative to the problem, usually the neuroanatomical and neurophysiological substrate, and then proceed to an elaboration of specific mechanisms determined in part by the substrate and in part by the environment and its special features of systematic stimulus control and influence.

The recent success of biochemistry in establishing the elements of a genetic code utilized by biological memory, in the reduplication of the general features of morphology as expressed in inheritance, and in the specification of templates for cellular proliferation and immune reactions, has led to an interest in the extension of these approaches to the biochemical basis of learning and memory. It seemed, therefore, important to begin this conference with a survey of the present status of the neurochemical approaches to learning and memory. This led, inevitably, not only to a consideration of the specific chemical change to be sought and measured, but to a discussion of what had been learned and remembered. The plasticity and flexibility of the nervous system as manifested in the dynamics of behavior-change offers tremendous challenges to the investigator and calls for a variety of techniques for the elicitation, measurement and assessment of such changes.

Accordingly, the next presentations are devoted to the electrophysiological, neurophysiological and behavioral indices and assessments of adaptation and change in the nervous system which might be correlated with biochemical transitions and transformations during conditioning and learning. This is followed by a résumé of the origins and present status of concepts and theories of conditioning and learning, and discussion of the methodological basis for differentiating and sharpening the psychological aspects of the problem. In this respect, the advances in computer facilities have led to the increased use of mathematical models and to the development of artificial intelligence as an extraneural parallel and as a basis for testing ideas and concepts relative to learning and memory.

Following these basic and theoretically oriented approaches to an understanding of conditioning and learning, a second group of presentations sur-

veys two areas of high current interest and activity. The first, marking the recently renewed emphasis upon experimental child psychology, deals with the ontogenetic aspects of development and learning as revealed by the changing behavior of young children. The second emphasizes the variety and novelty of modern methods of programmed learning and teaching machines, a development of great interest, not only theoretically so far as this conference is concerned, but practically and empirically with respect to the demands of modern society for increased education and a rapidly expanding educable population.

The third group of presentations was deliberately planned to examine learning and learning potentiality in terms of contrasting groups and situations, namely the limitations imposed upon the mentally retarded by genetic accident or design, by trauma, by social and cultural deprivation, and contrastingly, the analysis of the factors constituting high mental endowment and creativity.

The nature of creativity is itself discussed by a renowned author, whose recent book, *The Act of Creation,** tries to find common ground in the creative acts of artists, authors, inventors, scientists and others, and attempts to account for this communality historically, philosophically and empirically. The Conference thus comes to an end with Mr. Koestler's development of a theory of the creative process based on biological, neurological and psychological principles.

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* Koestler, A., *The Act of Creation*. Macmillan, New York, 1964.