obras en la psicología contemporánea. Si no la ha leído todavía, léala y si la ha leído, léala otra vez.

Skinner nos ha entregado en todas sus obras los resultados de más de 40 años de investigación científica sobre la conducta. Es hora ya, que con el conocimiento de estos resultados dejemos atrás la etiqueta de "skinnerianos" o "anti-skinnerianos" y empezemos a trabajar *más allá de Skinner.*

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Physiology of Color and Pattern Vision. Koiti Motokawa. Tokyo: Igaku Shoin Ltd., 1970 (Distributor: Springer-Verlag, Berlin — Heidelberg — New York. 238 pages.

This is a beautifully printed and boxed volume that provides a complete summary of the work of a distinguished Japanese physiologist. The late Professor Motokawa began his long career of experiments in vision at Tohoku University with a study of the EEG in 1940. Shortly thereafter he began work on the human ERG and identified, with Dr. T. Mita, a fast component which they termed the "X-wave." This turned out to be a photopic *b*-wave, as shown independently by Adrian a few years later. In the years since World War II, with many students and colleagues, Motokawa investigated electrical responses in the retinas and higher visual centers of a variety of laboratory animals. But the work that occupied a major part of his efforts was on the phosphenes resulting from electrical stimulation of the human eye. As he reports in the Preface, ". . . we made the exciting discovery that the wavelength of the illuminating light is a determining factor in the threshold of an electrical stimulus. Encouraged by this new finding, Prof. K. Iwama and I devoted ourselves to developing a method for systematically studying the retina using the new technique. . . ." "The method . . . has proved to be most suitable for studies of color vision . . ., optical illusion, visual sensation of movement, stereoscopic vision, figural after-effects, etc., none of which can be adequately investigated by electrophysiological techniques." In 1965 Professor Motokawa became President of Tohoku University, and in 1971 he died.

The purpose of this book is, "to present the major studies on vision performed in our laboratory at Tohoku University in the past twenty-five years, and also to describe in some detail related studies in other labora-

tories." It runs to 283 pages and includes 137 figures and nearly 500 reference citations.

Chapter 1 is on the retina, with emphasis on the ERG, its component waves, and their origins. While these topics are indeed covered, little attention is given to the problem of isolating photopic from scotopic responses. This would have required discussions of light and dark adaptation, flicker, and counterphase alternation, topics not included in the chapter. Chapter 2, on the visual pathway, includes sections on electrical activity in the optic nerve, lateral geniculate body and visual cortex. Chapter 3 is on pattern vision. It discusses the receptive fields at various stages in the visual system and covers the topics of lateral inhibition and contrast. Consideration of receptive fields is further extended by Chapter 11, on simulation of the visual system. This is a chapter on the mathematical models developed principally by Hiwatashi and his colleagues. The purpose of these models is to simulate the actual responding of cells at various levels in the visual pathway. Provision is made for the temporal relations such as the Broca-Sulzer effect, and for spatial effects such as the elongated fields of excitatory and inhibitory activity shown by cortical neurones.

The majority of the book, Chapters 4 to 10, is taken up with Motokawa's favorite topic, the one he has called "retinal induction." Experiments on this topic were conducted on human subjects with a pair of electrodes on the skin near one eye. Short pulses of current through the eye were delivered by a D.C. stimulator supplying these electrodes. The current was set initially to a value high enough to produce an apparent flash or "phosphene" in the visual field. The current was then reduced in large steps until the threshold was approached, at which point much smaller steps were used and the subject was asked to judge which one of a pair of stimulus intervals contained the stimulus pulse. Threshold was defined as either (a) the current for which the subject was unable to make this judgment on three successive pairs, *or* (b) the current for which the subject made 2 errors on three successive pairs.

Motokawa claimed that phosphene thresholds were lowered by presenting a flash of light prior to the current pulse. Furthermore, the time interval between light and pulse was said to be optimal for red light at 1 sec, green at 2 sec and blue at 3 sec. This led to the hypothesis that the spectral sensitivity functions of the three fundamental response mechanisms for color could be ascertained by measuring the intensity of flash, at each wavelength, to cause a given change of phosphene threshold when the appropriate flash-pulse interval was employed. It also led to the hypothesis of

the "multiple threshold," i.e., the notion that with a 3-sec interval the blue mechanism would produce the lowest phosphene threshold, but the green mechanism would produce a somewhat higher one and the red a still higher one. Thus, Motokawa believed that there were discontinuities in curves relating frequency-of-seeing to stimulating current. Thus, it was his contention that the criterion for threshold might be met at more than one value of the stimulating pulse, but that only the lowest value so obtained was valid for the particular mechanism being investigated.

In the 25 years since the first appearance of Motokawa's phosphene experiments he and his colleagues produced more than 50 reports of experiments based upon this technique, covering nearly every aspect of color and form perception, and these are amply summarized in the present book. Psychologists were at first impressed with the potentialities of the new method (see Gebhard, 1953). Later, however, serious logical and methodological flaws in it began to appear. It is of some significance that at the present time it is omitted or scarcely mentioned in the textbooks on vision and visual perception. Riggs et al, in 1957 failed to confirm the multiple thresholds or specific color effects and attributed Motokawa's findings to his use of non-standard psychophysical procedures. These methods, while they appear to yield phenomenally low variability, incur the danger that the results obtained may be influenced by the preconceptions of the experimenter. Howarth and Treisman concurred, in 1958, with these conclusions. They also found that the main effect of a flash of light preceding the pulse was to act as a warning that the pulse was about to be given. The effect of this warning was to produce an apparent lowering of the threshold. Equally beneficial results were obtained with an auditory signal in place of the visual one. Indeed, when a bell was sounded one second before the pulse of current, the threshold of the latter was lowered by the bell but was unaffected by any flash of light preceding it by any interval of time.

In summary, the Motokawa book is mainly useful for documenting the extensive electrophysiological and psychophysical researches of the author and his colleagues. The related work of others in electrophysiology is also briefly summarized. For psychologists, the main interest of the book may well lie in the fact that unique psychophysical methods have been used in a majority of the work described. It appears at the present time that this work is largely ignored, however, because of unresolved questions about the validity of the psychophysical concepts and methods. Perhaps some

day there may be a revival of interest in the phosphene-light interactions when these questions can be cleared up.

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Teorías Contemporáneas del Aprendizaje. Winfred F. Hill. Buenos Aires: Editorial Paidós, 1971 (2a. ed.). 344 páginas.

La traducción del libro *Teorías Contemporáneas del Aprendizaje* de W. F. Hill es en términos generales adecuada. Cabe mencionar que existen errores de traducción en lo que se refiere a ciertos términos técnicos como reforzamiento (refuerzo), cognoscitivo (cognitivo), manipulando (manipulador), y otros más, lo que sin embargo, no resta comprensión a la lectura del texto.

En lo que toca a la obra propiamente dicha, el libro de Hill puede encuadrarse dentro de los lineamientos de una obra similar, previa, *Teorías del Aprendizaje* de Ernest Hilgard (México: Fondo de Cultura Económica, 1961), pero con la desventaja de no contar con una revisión reciente que la actualice (*Teorías del Aprendizaje*, Hilgard y Bower, en preparación por Editorial Trillas, México). El libro está organizado en términos de una revisión de las diferentes teorías sobre el aprendizaje, que históricamente han destacado, examinándolas más dentro del contexto lógico y empírico que dichas teorías determinan, que en términos propios de una ciencia natural, es decir, analizando la relevancia de los parámetros de los fenómenos estudiados y la adecuación de los conceptos e hipótesis que de ellos emanan. Da la impresión de estar reviviendo problemas muertos para la psicología experimental moderna, cosa aún más grave, si se considera que el texto va dirigido fundamentalmente a profesionales de la educación, neófitos en la materia.