them. In his synthesizing chapter Zuckerman appropriately emphasizes the importance of individual differences, and even proposes as a central proposition that "every individual has characteristic optimal levels of stimulation and arousal for cognitive activity, motoric activity, and positive affective tone," involving constitution, age, learning, recent levels of stimulation, task demands, and diurnal cycling as factors in the particular optimum level at a given moment.

Despite the obstacles, however, it would be fair to say that the bulk of evidence gathered over the last 15 years in the main supports the original claims. On specifics, there is still little agreement across studies. The developments over the years have been toward greater specificity both in the delineation of fundamental parameters and in the attribution of effects. For example, one would no longer claim "hallucinations" (or its current operational variant, "reported visual sensations") as effects due directly to sensory reduction; the current view would require more qualification and would speak of them as being facilitated by or occurring with greater frequency in sensory reduction as compared with a number of other conditions, depending on arousal level, set, personality, and so on. Certainly, today's researcher would be most cautious about linking these phenomena to psychosis. Similarly, the current position on cognitive impairment would specify that it is more likely to occur on tasks requiring complex, self-directed efforts; and so on down the line with each behavioral index. Nevertheless, the overall conclusion of the early McGill studies remains: namely, that sensory stimulation is an important ingredient in the maintenance of effective functioning. In fact Zuckerman, summarizing his chapter, offers the reader a stronger version of the old aphorism when he suggests that variety (in stimulation) is the *bread*, not simply the spice, of life.

LEO GOLDBERGER
*Research Center for Mental Health, New York University, New York City*

## The Straight and Narrow Path in Psychology

**The Scientific Evolution of Psychology.** Vol. 2. J. R. KANTOR. Principia, Granville, Ohio, 1969. xxii + 430 pp. + plates. $12.

It is doubtful that any psychologist has ever managed to believe even one impossible thing, much less six before breakfast. A great many, however, have succeeded in believing things that are, to say the least, very difficult. Take, for example, John B. Watson's (fl. 1920) famous assertion that "so-called thinking" is nothing more than minute, subvocal contractions of the muscles involved in the production of speech. Clearly, this is a belief that does not come to one without a certain measure of effort and practice. Watson, though, proved himself to be more than equal to the task, for in the end he succeeded in believing a whole family of difficult things. Thus, in his view, *all* matters that fall under the heading of "so-called consciousness"—"sensation, perception, attention, will, image and the like"—are in reality nothing more than bits of external behavior that have been variously misconstrued. And it is this insight, he went on to suggest, that "when rightly understood goes far in breaking down the fiction that there is any such thing as mental life." Thus, to take a small example, Watson could have spoken quite comfortably of a toothache stimulus and of the resulting toothache behavior; but the toothache itself (the "so-called toothache," he would have said) would have seemed to him nothing but a fictional construction. It is not known whether Watson's own toothache behavior was in any way altered by this insight.

Watson was aware that the evidence for his view was not entirely overwhelming. Even so, he felt obliged to put it forward, for so far as he could see it was the only account of "so-called consciousness" that was acceptable "in terms of natural science." Of course, many years have passed since Watson's proclamation, and in that time the enthusiasm to which it initially gave rise within psychology has waned considerably. Still and all, the Watsonian doctrine that the paraphernalia of mental life are fictions, and thus of no account "in terms of natural science," survives in many quarters and is in all events a force to be reckoned with. Probably the most widely known of the doctrine's present-day supporters is B. F. Skinner, who speaks of the "fiction of a mental life" with something approaching militancy. Less well known outside of psychology, though equally fervid in his support of the Watsonian doctrine, is the author of the volume here under review, J. R. Kantor. As one may judge from its title, Kantor's book is the second volume of a two-volume study in the history of psychology. The first volume, which was completed and published some years ago, covered the period extending from Greek classical antiquity up through the end of the Middle Ages. The present volume takes the story up again in the 17th century and brings it about as close to the present as space and historical perspective will allow.

The scholarship and historiographic art that have gone into the production of these volumes simply cannot be doubted. They are sound and respectable works, and whoever reads them will surely gain a good knowledge of the historical development of psychology. Nonetheless, the prospective reader must be issued a caveat, especially if he is not yet privy to the fact that psychology is a science in which it is still possible to enjoy the pleasures of polemic. For these are not works of pure, disinterested historiography. Quite the contrary, they take throughout the form of historical stones for the grinding of contemporary axes. This is not necessarily a flaw in a work of this sort. Indeed, the reviewer would ardently agree with Kantor when he observes that the psychologist would do well to use the history of his discipline "as a tool for understanding and promoting psychological work here and now." Still, the work has its biases (honest and forthright though they be), and this is a fact of which the prospective non-psychologist reader ought not to lose sight.

It is Kantor's view that psychology has evolved into a natural science precisely insofar as it has succeeded in recognizing the fictional character of those "transcendental concepts" with which psychological thought and research have been so long laden. One might imagine that what he has in mind here are such disreputable musings as "incorporeal soul," "entelechy," "vital force," and the like. Of course, he would include notions of this sort under the heading of "transcendental concepts," but he would also want to include all those matters that the pre-Watsonian psychologist spoke of, without compunction, as the "phenomena of mental life." Thus, in Kantor's view, the scientific maturity of psychology at

any given time is an inverse function of its concern with such fictitious matters as thinking, perception, emotion, and the like.

Given this initial affirmation, the historiographic task then becomes simply that of recounting the successes that psychology has achieved down through the ages in shucking off these ill-conceived concerns. As it happens, these successes have been rather few and far between. Thus, as Kantor portrays it, psychology had some promising "naturalistic beginnings" in Greek classical antiquity. From these, however, it all too soon "departed in the Hellenistic period when psychological interests were cultivated by the Christian Church Fathers." This waywardness persisted right up until the 17th century, which is when psychology, spurred on by successes within the other natural sciences, at long last began to grope its way back toward the true path. Indeed, only in the present century has psychology finally found its way back to the straight and narrow path of natural science, and even now it has only succeeded in placing one foot upon it. The other foot, alas, is still dragging along in the unscientific mud. Thus, as Kantor sees it,

> [even though] the psychological field is no longer completely dominated by the transcendental tradition centered about or allowing extraspatial or supernatural factors, which cannot be tolerated by any science, it is still not entirely emancipated from nonscientific ways of thinking. Psychologists still today concern themselves with 'sensations,' 'emotions,' 'experiences,' and other transspatial constructs.

Let it be recognized, then, that these volumes are heavy with polemic. This, however, should not dissuade one from reading them, for as we have said they are the result of an honest and entirely competent historiographic effort. Moreover, they give good expression to an important psychological point of view which, in less competent hands, is apt to seem rather crude and sophomoric. This, of course, is the Watsonian view that mental states and mental processes have no reality "in terms of natural science." The considerations that prompt Kantor to hold this view may be briefly summarized as follows: (i) "Sensations," "emotions," "experiences," and the like are mere theoretical constructions; (ii) moreover, they are bad theoretical constructions—bad because they are fictitious, fictitious because they are "transspatial." Of the criticisms that might be lodged against this line of reasoning, we need say only a word: (i) To the dentist, a patient's toothache is indeed a mere theoretical construction—a thing inferred from the patient's behavior and the state of his teeth. To the patient, however, it is not a theoretical construction at all, as may be readily appreciated by anyone who has ever had a toothache. The same point may of course be made about any of the "phenomena of mental life." (ii) "Transspatial" and "extraspatial" are mere epithets. Insofar as they mean anything at all, they denote a priori restraints to which no natural science of the present century could reasonably submit. It is true that a toothache is not "spatial" in quite the same way as a chair is. But neither, we are told, are any number of the arcane matters with which certain of the other sciences unblushingly concern themselves. If it were to be widely held that "transspatial" and "fictitious" are synonymous, then we should all perforce go back to being good Galileans and Cartesians.

RICHARD LOWRY
*Department of Psychology,*
*Vassar College,*
*Poughkeepsie, New York*

## Köhler's Perception

**The Task of Gestalt Psychology.** WOLFGANG KÖHLER. Princeton University Press, Princeton, N.J., 1969. viii + 166 pp., illus. $6.50. Herbert Sidney Langfeld Memorial Lectures, 1966.

Wolfgang Köhler, who died in June 1967, was the last remaining member of the original Gestalt school of psychology. Köhler was born in Estonia of German parents and was brought up in Germany, to become by 1921 the director of the Institute of Psychology in the University of Berlin. He resigned in 1935, after defying Hitler and all his works, to settle in the United States. He grafted a German tradition onto the very different stem of American empiricism, at that time flowering with J. B. Watson's behaviorism. Gestalt psychology was a strange graft, generally appearing more alien than symbiotic; but the contrasting colors of the two blooms emphasized their special features.

Köhler's main works are: *The Mentality of Apes* (1917), in which he described "insightful" behavior, solutions occurring suddenly rather than by overt trial-and-error; *Gestalt Psychology* (1929); *Dynamics of Psychology* (1940); and many papers, originally appearing in *Psychologische Forschung*, mainly concerned with problems of perception. The present book is a series of four lectures—delivered at Princeton in 1966—posthumously edited by Solomon Asch, Mary Henle, and Edwin Newman, and introduced with a useful historical essay by Carroll C. Pratt. The lectures discuss the early contributions of Gestalt psychology to perception, physical analogies for describing brain function, and experiments on d-c cortical recording, and include a delightful description of the classical observations of the "genius" chimpanzee Sultan and the active but less "insightful" Rana engaged in reaching bananas from movable boxes. This study was undertaken over 50 years ago and has been discussed by psychologists ever since. It takes on a fresh significance now that "intelligent" machines begin to have similar ability: What is it to build "insight" into a machine? Are psychological theories adequate to tell us?

In these lectures Köhler seldom goes back on his earlier statements or adds anything significantly new. Rather, he surveys with some satisfaction past achievements of the school of which he was so eminent a member. But is there cause for satisfaction? What remains of importance from the vast wordage of Gestalt writings? Certainly Köhler's observations of chimpanzee problem-solving are a foundation stone of ethology. The Gestalt rejection of mosaics of stimuli or sensations (not always clearly distinguished by Köhler) and the emphasis on interactive perceptual effects involving large units, was demonstrated by simple experiments with patterns of dots. We would not, however, now accept that the significance of these effects was correctly appreciated by those who pointed them out.

Perhaps the Gestaltists' works suffered somewhat from pollution by a stifling metaphysics; at any rate the Gestalt rejection of analysis, or explanation in terms of logically simpler concepts or defined underlying mechanisms, makes their theories no more than occasionally suggestive. Worse, it is far too easy to raise serious difficulties, questions which they should