Book Reviews

Experimental Psychology: Fechner's Great Work

In his own view Gustav Theodor Fechner was not primarily a psychophysicist. Before he coined the term he was well known as a physicist, and during 70 years of intellectual productivity he was a physiologist, doctor of medicine, poet, estheticist, and satirist as well. Most consistently, though, he aspired to be a philosopher. As Edwin G. Boring points out in his introduction to **Elements of Psychophysics**, volume 1 [Translated from the German edition (1860) by Helmut R. Adler. Davis H. Howes and Edwin G. Boring, Translation Eds. Holt, Rinehart, and Winston, New York, 1966. 320 pp., illus. $6], Fechner intended psychophysics merely to contribute to his philosophy. His aim was to overthrow materialism, and psychophysics would help by showing empirically the relationship between mind and body. However, Fechner is remembered for his psychophysics. From our vantage point his measurement of mental processes laid the foundation of experimental and quantitative psychology.

Fechner thought of the *Elemente der Psychophysik* as elementary, as "nothing but the paltry beginning of a start." Again, we have a different view. We can interpret the *Elemente* in his title to mean elementals, or essentials, for the concepts and methods developed in this book have remained central to the study of sensation and perception ever since. In fact, there is now renewed interest in the field Fechner began, as reflected in the recent creation by two major universities of professorships in psychophysics. The observance by the American Psychological Association and the Psychometric Society of the centennial of Fechner's publication also served to underscore his sustained impact [*Psychometrika* **26**, 3–63 (1961)]. There have been advances, but few that he did not anticipate.

Now Fechner's ideas were not wholly new when he published them, and he writes that "it would be a poor recommendation if they were." He himself believed that E. H. Weber should be called the father of psychophysics—for recognizing the generality of one of psychology's early "laws," namely, that the just noticeable difference in stimulus intensity bears a constant ratio to the basic intensity. Moreover, all three of the methods of measurement Fechner used had previously been used by others. What was it, then, that Fechner accomplished? He attacked frontally the inherent and unique difficulties of psychological measurement, specifically "the great variability of sensitivity due to individual differences, time, and innumerable internal and external conditions." Through great ingenuity and by perseverance in his experiments, he was able to stipulate the many considerations and precautions that were necessary and sufficient to yield reliable measures of sensitivity. He revealed the conditions required for accuracy in relation to the observations and to the calculations, and the dependency of these requirements upon the method used and upon the sensory system and sensory dimension under investigation. The evidence that his techniques worked came from data he reported on judgments of visual intensity and of color, of auditory intensity and pitch, of size and distance sensed visually and tactually, of pressure, lifted weights, temperature, time, and motion. He thus laid the groundwork for measuring discrimination capacity along various dimensions of sensation in most sensory domains, for measurements of the kind that have led to much of our present knowledge about the functioning of the sense organs. Fechner's techniques have also been used with more "interesting" stimuli—in the study, for example, of personality and social processes.

Though Fechner assures us, perhaps 50 times, that more detail on experimental techniques will be made available in a supplement (which probably never appeared), there is plenty of detail in the present volume. And while the substance has long since been incorporated into the science of psychology, the flavor of how psychology became a science is nowhere so adequately illustrated. Be warned, however, that Fechner is not easy to read, even in English. His sentence structure is long and involved, and Adler's foreword justly characterizes his style as diffuse and redundant. Still, the leisurely approach contributes to the charm of the book, if only for the personal vignettes it permits. Fechner writes that one experiment required him to hold a weight suspended long enough to cause a pain in the region of the spleen. He adds: "A mustard plaster seemed to be good for it." Again, after lifting heavy weights: "my blood rushed to my head, which is one of my weaker parts, due to some earlier ailment, whereas my very healthy chest suffered no ill effects."

Howes's preface to the text acknowledges that "Not many of the psychologists who pay tribute to Fechner as one of the founders of their field have been able to read its 350,000 words through from beginning to end." Now we have available the more important of his two volumes. We can see the basis for his immediate influence on such men as Helmholtz, Mach, and Wundt, and his eventual influence on many others, including Freud. We owe our thanks and congratulations to Adler, Boring, and Howes for their able performance of a valuable service.

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Change and Adaptation

A handful of medical researchers is currently working on ways to enable parents to choose the sex of their unborn children. If (or when) these researchers succeed, society will have to adjust to the various imbalances this procedure will create. Sociologists have considerable evidence that more boys than girls will be "ordered," especially among the lower classes. This imbalance, and others like it, may in fact upset many societal institutions, including the monogamous family structure, ethnic relations, and employment and vot-