

Of the one hundred and nineteen authors to whom he refers, twelve are French, seven English, seven American and one Italian; but ten of the papers of these foreign authors are published in German. Witasek does not even avail himself of the support to be found in the work of contemporary American and English psychologists for the anti-sensationalistic conception of psychology.

The book as a whole may be recommended confidently to all who interest themselves in those theoretical discussions underlying any fruitful applications of psychology. It is written in rather unilluminated and involved style, but it repays study.

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PSYCHOPHYSICS.

Lehrbuch der psychologischen Methodik. ALFRED LEHMANN.
Leipzig, O. R. Reisland, 1906. Pp. vi + 131.

The author proposes to give a manual of psychophysical measurement methods for the use of students with little or no mathematical training. Complicated demonstrations are avoided for this reason and the text of the book is confined to the description of the methods of calculation. The hypothesis of the Gaussian law is not made, because the author believes that we have to deal in most psychophysical problems with variable errors which cause asymmetrical distributions.

A quantitative psychological measurement is possible under either one of the following conditions. If a psychical state P depends on a physical condition R which admits of quantitative variation in such a way that P undergoes quantitative or qualitative variations if R varies, then it is possible to find a mathematical relation between these two phenomena and we call P a function of R . If, on the other hand, a psychical state P influences an external condition B in such a way that B assumes different values when P undergoes quantitative or qualitative variations, then we call B a function of P . The object of psychophysical experiments is to find series of the magnitudes P and R (or B), so that every element of one series is adjoined to a certain element of the other. These results must be subjected to a mathematical treatment in order to eliminate errors and to find, if possible, the nature of the function which exists between P and R or P and B . The scope of psychophysical measurement methods as defined by Lehmann is wider than that of the usual definition, in so far as it covers not only the measurement of sensation but also all the problems which admit of an exact treatment, as *e. g.*, the measurement of association and of memory.

The book consists of two parts, the first of which treats of the errors and their elimination, and the second of the methods of psychophysical measurement. The errors may be constant, accidental or variable. Constant errors may be eliminated by a proper arrangement of the experiments, if they are of the same magnitude and of opposite sign in two sets of experiments. The space error is an example of a constant error which may be eliminated in this way, whereas the time error has different sources so that in some cases it may be eliminated and in others not. Accidental errors follow the law of Gauss and may be eliminated by calculation. The chapter on variable errors is a short description of the method of interpolation by means of Newton's formula (the method of differences); the reader will find this chapter a handy and useful introduction to the use of Newton's method. This chapter is followed by some remarks on setting up an algebraic equation by the method of differences and on finding the most probable values of the constants of an equation by the method of least squares. The latter procedure is illustrated by an example on inhibition and reinforcement of sensations of pressure, which is taken from the author's 'Beiträge zur Psychodynamik der Gewichtsempfindungen.' Lehmann uses in his description of the method of least squares the term *condition equation* where the term *observation equation* ought to be used.

The second part of the book contains the description of the methods which serve for the measurement of association, of sensation, of inhibition and reinforcement, of reaction time and of energy. The presentation of the matter is clear and practical, and one finds a great number of useful hints as to the advantages of different ways of approaching a problem. Lehmann gives three methods for the measurement of sensation: the method of limits, the method of equal appearing differences and the method of constant stimuli, whereas Fechner's method of average error and the method of Lipps meet with an unfavorable judgment. The author describes three forms of the method of constant stimuli, only two of which were known before (Müller's method and the so-called abbreviated form of the method of constant stimuli). The third form, the complete method of constant differences as Lehmann calls it, consists in an interpolation and adjustment of the data. This method does not make any assumption about the law of distribution. The data of experiments on simple reaction time are treated by the method of the curves of distribution as suggested by Alechsieff and Bergemann, whereas the treatment of complex reactions is shown on some results of the late Dr. Buch. The chapter on

measurement of energy is very short and its topic is confined to Vogt's experiments and to Lehmann's ergographic experiments on inhibition.

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ÆSTHETICS.

The Æsthetic Experience: Its Meaning in a Functional Psychology. A Dissertation. ELIZABETH KEMPER ADAMS. The University of Chicago Press, 1907.

Interest attaches to this monograph of Miss Adams' not only because of an increased interest in æsthetics in general but the rather because it represents the first attempt to extend the functional method of interpreting experience, as the several writers of the Chicago School interpret the term 'functional,' into what would appear, in the light of current discussion, its most difficult field. Miss Adams fully appreciates this fact and rightly concludes that the æsthetic experience is to be regarded as a sort of 'test case' of the functional position in general. Professor Angell has already pointed out that logic, ethics and æsthetics are but systematic developments of the problems that belong primarily to a functional psychology, or, conversely stated, a functional psychology, if not estopped, must issue in a logic, an ethics and an æsthetics. The sort of logic that results from the attempt to apply the functional method to the higher thought processes is to be seen in Professor Dewey's *Studies in Logical Theory*. Doubtless the same is true of Dewey and Tuft's *Ethics* which has just come from the press. In this monograph of Miss Adams' we are presented with the programme of 'pragmatism in æsthetics.'

Miss Adams' description of the functional position and method is faithfully done and there is no need of repeating it here. The real test and standard of any conscious experience, she says, reside not within itself but in the conduct to which it leads. Such description of conscious experience tends to break down the hard and fast distinction between psychology and the normative or valuational disciplines. All forms of consciousness whatever are possessed of meaning, of reference to something beyond, and the normative disciplines represent only the most conspicuous instances of such values. In short, consciousness is but the registration of values. But as evaluational, consciousness faces both ways, in other words, has both a backward and a forward reference. In every situation there is just so much of the past as is needed for the efficient control of the matter in hand. The reshaping and the resulting elimination and synthesizing of this ma-