likelihood that one can breathe the confining air of the laboratory, or that one will presently limit one's range of interests to ,oneself. Partly it is a matter of temperament, partly a matter of chance introduction or of continued occupation. The two types of psychologist are distinct: all the more reason that they should work in harmonious cooperation.

I hope that, in this latter portion of my address, I have not traveled too far out of the record. Some men have problems thrust upon them. And, after all, if what I have said contributes ever so little to the furtherance of mutual aid and the increase of mutual esteem, as between psychologists of different camps, I may hope for forgiveness, even though I have exceeded the letter of my instructions. Now let me briefly summarize what I have said. I began, you will remember, by pointing out that, above and apart from the many special problems of experimental psychology, there lies the great problem of self-definition, of the range and scope of the experimental method in psychology. Then, under the headings of psychology proper and of psychophysics, I called your attention to a series of laboratory problems that, more or less insistently, more or less immediately, call for solution. Whatever else experimental psychology may be, I said, these issues are issues of experimental psychology. Incidentally, I deprecated any departure, at the bidding of philosophy, from the straight path of psychological investigation; and I deprecated also that neglect of introspective control in psychology which has been the besetting sin of many whose direct interest lies in psychophysics. I then went on to include in experimental psychology the more objective applications of the experimental method in child psychology, in animal psychology, in abnormal psychology. It was not my

province to detail the special questions in these fields; they form the topic of other addresses in other sections. But I should regard as incomplete any review of the problems of experimental psychology which omitted reference to them. Their consideration helps us to attack that first problem of definition, clarifies our method, and furnishes an opportunity for the give-and-take of criticism and encouragement. We can not afford to misunderstand one another, as we can not afford to waste our time on unreal and constructive problems. The work presses; the rule of work is definite and unmistakable; there is room in the workshop for all sorts and conditions of men. I do not think that the outlook of any science could be more hopeful; I do not think that we need fear a lessening of that quiet enthusiasm which, from the first, in the beginner as in the mature student, has been the salient characteristic of the experimental psychologist.

E. B. TITCHENER.

SCIENTIFIC BOOKS.

An Introduction to the Theory of Mental and Social Measurements. By EDWARD L. THORNDIKE. New York, The Science Press. 1904. Pp. 212. 8vo. Price, $1.50.

In this book Dr. Thorndike has undertaken to explain the 'meaning and use' of recent contributions to statistical theory 'in common language to a common-sense thinker.' " Knowledge will be presupposed of only the elements of arithmetic and algebra. Artificial symbols will be used only where they are really convenient." In order are discussed: Units of measurement, the measurement of an individual and a group, the causes of variability and the theory of probability, the arithmetic of calculating central tendencies and variabilities, the transmutation of measures by relative position into terms of units of amount, the measurement of differences, changes and relationships and the use of tables, reliability of measures and errors of measurements.

On the whole, the author's aim seems to be realized, although it takes over 200 pages. The frequency polygon, as a whole, is properly declared to be the unit of comparison which its constants by no means fully replace. The methods of determining the average, standard derivation and probable error are fully set forth and the explanation of the method of calculating the coefficient of correlation is particularly good.

Great stress is laid—properly enough in a book intended for psychologists whose material is not always directly measurable—on measurement by position and the transmutation of position into units of amount. Such a transmutation is easily effected when the frequency distribution is approximately normal. A little table, based on the table of the normal probability integral, is given, showing the deviation from the mean (in units of the standard deviation) of each per cent. class from 1 to 50. A handy table is also given showing the average deviation of any number of consecutive percentage classes. Of course, there is nothing new in this, but it helps to have the importance of the measure by relative position insisted on in a popular treatise of this sort, because it is not popularly understood.

In treating the measure of differences emphasis is laid on the importance of comparing the entire distributions rather than the averages only. The degree of overlapping of the frequency polygons gives the best insight into the degree of difference.

Under 'Measurement of Relationships' the measurement of correlation is considered and the Pearsonian method of analysis is plainly and fully set forth. In the chapter on 'Reliability of Measures' the determination of the probable error of the average and of a difference between two averages is fully described.

The book abounds in tables giving various statistical data. There is appended a multiplication table up to 100×100; also a table of squares and square roots. A table of the normal probability integral (apparently copied without credit from the reviewer's 'Statistical Methods') is found on page 148. A feature of the work is a set of 'Problems' at the end of each chapter.

The reviewer has noted in passing several defects which are mentioned here in order that they may be guarded against in the second edition. Part of Fig. 12 seems to be inverted. The 'Mode' is repeatedly spoken of where empirical and not theoretical mode is meant. The distinction should always be clearly made. Also, the mode is not the 'apex of the slope' (p. 73), but the abscissa of the apex. The method suggested of finding the mode is unnecessarily clumsy. The mode is approximately equal to the mean less $3 \times$ (mean — median). Tables XXXI. and XXXII., the first value of σ would seem to be a misprint for 2.57.

On the whole, we believe the book will be found very useful, especially in making more familiar the frequency polygon and leading to its more frequent publication in statistics in place of the bare average. And so we trust that it will be widely studied and its recommendations followed.   C. B. DAVENPORT.

American Hydroids. Part II. *The Sertularidæ.* With 41 plates. By C. C. NUTTING. Special Bulletin, U. S. National Museum. 1904.

The first part of this magnificent work, on the Plumularidæ, appeared in 1900, and was noticed at some length in our columns. Much of what was said about Part I. is equally applicable to Part II., and need not be repeated. Some idea of the value of the work may be gained from the fact that not more than 20 species of Sertularidæ from American waters have heretofore been discussed in any single publication, and now Professor Nutting presents us with complete descriptions and figures of no less than 130! These species, distributed by the author in ten genera, have been named by the following writers: Nutting, 37; Allman, 16; Linnæus, 12; S. F. Clark, 9; Kirchenpauer, 8; Hartlaub and Mereschkowsky, each 5; Ellis and Solander, Hincks, Trask, d'Orbigny and H. B. Torrey, each 3; Levinsen, Alder, Bale, Marktanner-Turneretscher, Murray and Lepechin, each 2; and J. E. Gray, McCready, Versluys, Poeppig, Stimpson, Sars,