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We cannot go further into details, but commend the volume to all botanists and horticulturists. Various indexes, of trees best adapted for certain purposes, of genera referred to, of synonyms, of vernacular names and of species best adapted to various regions of the globe, add greatly to the value. The price of the book is only five shillings.

JOSEPH F. JAMES.

Washington, D.C., Jan. 12.

*A Text-Book of Least Squares.* By MANSFIELD MERRIMAN. 6th Ed. New York, J. Wiley & Sons. 1892. 198 p. 8°.

*Theory of Errors and Method of Least Squares.* By W. W. JOHNSON. New York, J. Wiley & Sons. 1892. 174 p. 12°.

WE have here two excellent works, written by two able men, and illustrating in an interesting manner those different views of identical principles and methods which independent thinkers are always able to exhibit, however old and well-worked the subject. Professor Merriman wrote his first edition of this treatise in 1877, with the purpose of presenting the facts and principles of this somewhat abstruse subject in such form as to make them easily comprehended by students and by engineers, in practice often less familiar than the student with work underlying the higher mathematics. That treatise, while successful, served nevertheless, to indicate where still further improvement might be effected, and the present is a re-written treatise, of which the major portion was prepared

and printed in 1884, as a second edition. The sixth edition, now before us, contains the same matter in substance, but with the usual and unavoidable printers' and other errors, always found in first issues, removed, and some improvements introduced in the treatment of adjustments of two related quantities, and with notes of interest appended. The book has become a standard work of reference, as well as a text-book, and needs no special commendation from us, other than the expression of full agreement with the verdict of the purchasers and users of five issues, who have made necessary this sixth edition.

Professor Johnson has condensed his work into a smaller compass than the preceding; but it is all the more rich and "meaty." The author follows Gauss in the methods laid down in "Theoria Motus Corporum Cœlestium" (Werke, VII.), and treats the "reduced observation equations" by the more explicit methods introduced by Jordan ("Handbuch der Vermessungskunde," 1888) and later writers, including Oppolzer, to whom he goes for some of the more important forms adopted in computations. The book is systematic, logical in its sequence, and well illustrated by carefully chosen examples in application. Appended are tables of values of the probability-integral and of powers and roots.

When a mathematician of eminence undertakes thus to provide a treatise upon a subject of importance, and compiles a text-book, for young students, not only the youth who is thus provided with a text-book but the whole world of observers employing such methods become more indebted to him than to the less distinguished and less talented man doing similar work; we have the assurance, not only that the book will serve its purpose, but that it represents the latest and best thought and labor of the time. This assurance is worth much to teacher and pupil; and it can hardly be doubted that the use of this little treatise will extend beyond the limits of the United States Naval Academy, where it was originally intended by its author to be used, in his own classes.

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