

the reasonableness of M. Poincaré's exclusion or insertion of matter, none can be entertained of the excellence of his manner of exposition. Without long circumlocutions and yet with comparatively few symbols, he gets right into the heart of the problems he is discussing; it may be that he has chosen them from this point of view. No better example of his method can be furnished than the way he reaches the action of two rectilinear vortices on one another. The reading of this will appeal strongly to the student and whet his appetite for more information. In all the hydrodynamical part—and, indeed, in the rest of the book—practically the only results of an at all advanced nature that a student needs are those deduced from Green's theorem. But these have already been dealt with in the chapters on potential. An instructor who wishes to give a short course on hydrodynamics can hardly have a better model for the details than this chapter, and he will not find it difficult to add to it the portions which are necessary in order that his hearers may obtain a general idea of the problems which arise in the subject.

ERNEST W. BROWN.

SHORTER NOTICES.

Annuaire pour l'An 1900, publié par le Bureau des Longitudes.
Paris, Gauthier-Villars.

THIS handy little volume, brought out for popular and professional use, is as usual improved by the addition of new matter, the omission of portions of no special value, and the alteration of details here and there. Among the additions may be noticed tables of the right ascension of the sun at mean noon and of the right ascension, declination, and parallax of the moon, together with some auxiliary astronomical tables. The magnetic elements for the principal towns in France have been brought down to January 1, 1900. In the "Notices," M. Janssen gives his annual report of the work done at the observatory on the summit of Mont Blanc; he also contributes a note on the use of balloons for astronomical purposes. M. Lippmann describes briefly but clearly the discovery and main properties of the newly found atmospheric gases. The longest article is on the theory and construction of dynamos, and this deserves special mention. As is usual with French writers, M. Cornu be-

gins at the beginning, by explaining what is meant by a field of force, and then gradually leads the reader up to a clear comprehension of the principles used in the actual construction of a dynamo. He promises to resume this subject in a future notice. Finally, the speeches of MM. Bassot, Poincaré, and Loewy at the unveiling of the monument to Tisserand are printed in full, M. Poincaré giving a short account of the services rendered by Tisserand in the domain of celestial mechanics.

One important change, which it is hoped may become universal, has been made—that of reckoning the day from midnight to midnight, and numbering the hours from 0 to 24. This is already adopted in some European railway time tables. The great convenience of this plan will probably induce the editors of official publications, such as the Nautical Almanacs, to adopt it at a not very distant date.

ERNEST W. BROWN.

Elements of Precise Surveying and Geodesy. By MANSFIELD MERRIMAN. New York, John Wiley & Sons, 1899. 261 pp.

PROFESSOR MERRIMAN'S latest work will be found to be of considerable value to one who wishes to become a practising surveyor and may be said to be almost indispensable to a candidate for a post on the Coast and Geodetic Survey. In the government service operations are frequently on a much larger scale than in private practice, and the work culminates in the measurement of a meridian arc—a process requiring extreme care to obtain the accuracy demanded today.

There are eleven chapters, the titles of which will sufficiently indicate the scope of the work. They are: least squares, precise plane triangulation, base lines, leveling, astronomical work, spherical geodesy, spheroidal geodesy, geodetic coördinates and projections, geodetic triangulation, figure of the earth, tables. In these not only are the mathematical parts of the subject fully and clearly set forth, but the practical details so necessary for successful results are so described that the reader may recognize their relative importance. On page 8, however, a remark is made which is somewhat dangerous for a beginner, namely, that observations affected with mistakes must be rejected. A "mistake" should be very clearly defined. It is true that this remark is qualified by a fuller statement on pp. 44, 45, but a warning should be inserted then and there that this rejection must never take place without very good cause. Much astronomical work has been looked on with