Cours d'Astronomie. By H. Andoyer. Paris, Hermann.
Première partie: *Astronomie théorique*, Third edition, 1923. 455 pp.
Seconde partie: *Astronomie pratique*, Second edition, 1924. 316 pp.

The third edition of the first part of Andoyer's comprehensive text on spherical astronomy (*Astronomie théorique*) has undergone considerable changes when compared with the two previous editions. The changes affect the theory of precession and that of the eclipses of the Sun and the Moon. There is besides in the new edition an additional chapter which deals with the determination of a Keplerian orbit, when three approximate observations are given. The material of the text is subdivided into four larger sections (livres); each section contains a number of chapters. There are altogether twenty chapters. The author's acknowledged mastership has given to science a text which ranks well with the four volumes of Tisserand's *Mécanique Céleste.* Very few and rather insignificant misprints have been noticed. It is observed that very few references are given, and an index would have added considerably to the usefulness of the text. The reader familiar with the English or German notations in spherical astronomy will probably wish that terms like *hour angle* (τ) and *sidereal time* (θ) had undergone no changes in notation. Likewise it would seem that to represent a star by letter M is not very fitting, particularly when the parallactic angle is represented by S. We notice on page 120 the notation t for sidereal, τ for mean solar, and H for apparent solar time, which seems not very good usage.

In the introductory section one chapter is devoted to spherical trigonometry. No restrictions are based on the magnitude of sides and angles of the "general" spherical triangle. The formula $\cos V = \cos\alpha \cdot \cos\alpha' + \cos\beta \cdot \cos\beta' + \cos\gamma \cdot \cos\gamma'$ is made the basis of the general study and by purely algebraic transformations all of the systems of formulas used in spherical trigonometry are derived. The consideration of adjoined spherical triangles and polar triangles employed for elementary spherical trigonometry are here replaced by transformations "S" and "T". The invariants

$$D = 1 - \cos^2 a - \cos^2 b - \cos^2 c + 2\cos a \cos b \cos c$$
$$= 4 \sin s \sin(s-a) \sin(s-b) \sin(s-c)$$

and
$$D' = 1 - \cos^2 A - \cos^2 B - \cos^2 C + 2\cos A \cos B \cos C$$
$$= 4 \sin\sigma \sin\left(A - \frac{\sigma}{2}\right) \sin\left(B - \frac{\sigma}{2}\right) \sin\left(C - \frac{\sigma}{2}\right)$$

where $2s = a + b + c$, $2\sigma = A + B + C - \pi$, play in this theory an important role.

In the second and third sections the theory of the corrections is given which are to be applied to given observations. The reader will find among these the theory of refraction very attractive since very short and quite original. Designating the refraction on the path C