Chapter i. is entitled "Primitive Astronomy," much of the space, however, being taken up by explanations of the various definitions of the celestial sphere. Considering the amount of painstaking labour which has been devoted by many modern inquirers to proving the extent of the astronomical knowledge of the Egyptians and other ancient nations, as evidenced by their temples and monuments, it is rather hard to be told that this is but "a plausible interpretation of these peculiarities."

Chapter ii., dealing with "Greek Astronomy" from 600 B.C. to 400 A.D., is much more readable. Commencing with the introduction of the calendar and its various alterations, the successive celestial systems figured out by Plato, Aristotle, Aristarchus, Hipparchus, Ptolemy, &c., are very lucidly explained. The comparatively slow development of astronomy during the Middle Ages, from 600 A.D. to 1500 A.D., forms the subject of Chapter iii. Towards the end of this period, the first authentic conceptions of the celestial bodies being situated on concentric crystal spheres were enunciated.

The fourth chapter is entirely devoted to the enormous impetus given to astronomical knowledge by the teachings and work of the great Copernicus, extending over the period 1473 A.D. to 1543 A.D. The succeeding five chapters deal with the life-works of Tycho Brahe (1543–1601), Galilei (1564–1642), Kepler (1571–1630), and Newton (1643–1727).

Chapter x. deals with the progress of observational astronomy during the eighteenth century, the chief workers during this period being Flamsteed, Halley, Bradley, Maskelyne and Lacaille; while the following chapter reviews the mathematical aspect of the science for the same epoch, Euler, D'Alembert, Lagrange and Laplace occupying the places of honour.

Chapter xii. is devoted to the work of Herschel from 1738 to 1822. These few chapters are extremely interesting, but it is very disappointing to find that the astronomical progress of the nineteenth century is crowded into the remaining fifty pages. Considering the enormous advances made during this period, this is wholly out of proportion, and in consequence many important matters have either been merely mentioned or omitted altogether. For example, although the book is sufficiently up to date to mention the discovery by Prof. Nasini of a terrestrial gas whose spectrum contained a line probably coincident with the chief coronal line, it is distressing to find no mention whatever made of the gigantic Draper Catalogue of Prof. Pickering dealing with the classification of stars according to their spectra; indeed, the only reference to photographic work on stellar spectra is in connection with motion in the line of sight. Again, the whole matter of the organisation, &c., of the great photographic survey is contained in twelve lines. The mathematical portions of the science are, however, treated much more generously.

The author has attempted a very difficult task in condensing the whole history of astronomy into so small a volume, and it is from this standpoint that the book must be judged. Although to the individual there is much that is unsatisfactory, the work contains a great amount of useful information, which will no doubt cause it to find favour.

Outlines of Physical Chemistry. By A. Reychler. Translated by John McCrae, Ph.D. Pp. xvi + 276. (London and New York: Whittaker and Co., 1899.)

THE choice and arrangement of the subject-matter of this book is fairly satisfactory. It includes the laws of chemical combination, the atomic hypothesis, the gas laws, vapour density, the specific heat of solids and the periodic system. The second part contains a fuller discussion of the properties of gases and the critical phenomena, the connection between chemical constitution and the boiling point, volume, refraction and rotation of liquids, and the properties of solutions. The third part deals with thermo- and electro-chemistry and the nature of solutions of salts. The fourth part treats of chemical equilibrium and the velocity of reactions. The treatment of this subject-matter does not, however, appear to be distinguished by any striking originality or other special merit which would warrant the translation of the book. On p. 2, the law of constant proportions is stated thus: "In order to form a substance, it is always necessary to have the same elements united in the same proportions." This is much the same as saying that any two samples of the same kind of matter have the same composition. As Mr. Hartog pointed out in these columns, a correct statement of the law of constant proportions should emphasise the view, upheld by Proust, that the proportions in which two substances combine alter *per saltum*, and that there is not (as Berthollet believed) a series of compounds of all intermediate compositions bridging over the gaps.

It might have been mentioned that the conclusions drawn by Traube from his work on the volumes of liquids (pp. 66–70) are not universally accepted.

The account given of the reasons for assuming the existence of free ions in electrolytes is so incomplete as to be misleading. The work of Clausius is not mentioned, and the considerations which led Arrhenius to his extension of the hypothesis of Clausius do not receive much better treatment.

The evolution of heat accompanying the solution of substances like hydrochloric acid or caustic soda in water is regarded by the author as an insuperable objection to the ionic hypothesis in its usual form. To overcome this objection he proposes a modified hypothesis in which the sodium ion in solutions of sodium salts, for example, is supposed to be combined with an hydroxyl group. In order to explain the phenomena of electrolysis, the charged sodium ion is supposed to be continually passing from one hydroxyl group to another; an exactly similar supposition, however, led Clausius to assume that the ions spend at least some portion of their existence in the free state, so that the author's modification appears to consist in the addition of a new (and unnecessary) hypothesis to the old one. A discussion of this kind is, in any case, somewhat out of place in a book intended for beginners.

The translation might have been better; we do not like "luminary vibration" (p. 81); "the ascension of the mercury" in a thermometer (p. 137); "measurement instruments" (p. 189); "the comparativeness of our results" (p. 197); "electrolysable compounds" instead of electrolytes; "this scientist" (presumably *ce savant* in the original); "the momentary course of the reaction" (p. 249) instead of the velocity of the reaction at a given instant.

Views on Some of the Phenomena of Nature. By James Walker. Part II. Pp. vi + 187. (London: Swan Sonnenschein and Co., Ltd.)

AMONG the views expressed are that "Light is the sensation produced through the medium of the organ of vision by the action of multitudinous effluvia, exhaled by the sublimation of the incandescent substances which exist in the sun's photosphere, and which are borne into space by an eruptive force, emanating from the contracting body of the sun." After a review of a number of scientific and unscientific statements, the book concludes with the question "As to the 'mode of motion' theory of heat, or the 'wave' theory of both light and heat, of electricity and ether, is it any more than a fiction of the imagination?" Persons who would reply in the negative will be impressed by the arguments of Mr. James Walker.