

periodic table, which forms the frontispiece of the volume, does not give the atomic numbers of the elements—an omission which should certainly be rectified when a further edition of any of these volumes is called for. The value of this particular volume would also be much increased by a fuller appreciation of the part played by co-ordination in the formation of so many of the compounds of this group of elements.

### Our Bookshelf.

*Electrons, Electric Waves and Wireless Telephony: Being a Reproduction with some Amplification of the Christmas Lectures (96th Course) delivered at the Royal Institution of Great Britain, December, 1921, January, 1922.* By Prof. J. A. Fleming. Pp. viii+326. (London: The Wireless Press, Ltd.; New York: The Wireless Press, Inc., 1923.) 7s. 6d. net.

SIMPLE and excellent descriptions are first given of the phenomena which take place when waves are produced in liquids and gases. The author then gives an account of the architecture of atoms as imagined by modern physicists. The Rutherford atom is taken as the standard and the Planck-Bohr method, in which atoms are supposed to radiate energy, is described. The concluding portion of the book is on radio-telephony and will be very helpful to the intelligent amateur.

Prof. Fleming's discussions are on orthodox lines, but we were disappointed that he does not throw more light on the mechanism of Planck's quantum theory. Many of the numerical results obtained are wonderful and are corroborated in the most marvellous way by other methods. But the *modus operandi* is still a mystery. In describing the Michelson-Morley experiment it is stated that it proves clearly that the velocity of light is independent of the motion of the source of light or of the observer. We are not justified, however, in accepting this statement if an explanation can be given which satisfies the accepted canons of mechanical science. Such an explanation was given by Fitzgerald. The dragging in of space and time "frames of reference" does not help the ordinary reader. We are glad the author adheres as far as possible to the laws of classical dynamics. Some men of science are wondering how much of modern theory will remain when all the laboriously constructed scaffolding is removed.

*Poems of Science: Pages of Indian Earth History.* By K. A. Knight Hallows. Pp. xii+40. (London: Erskine Macdonald, 1923.) n.p.

MR. K. A. KNIGHT HALLOWES has worked for eighteen years on the staff of the Geological Survey of India, and the beauty and dignity of the country that he has studied have appealed to his poetic sense. In a series of sonnets, he touches on the origins and the decay of the rocks that control some of the noblest scenery of the earth; and again and again the bright hue of a delicate flower, springing from some cleft in a forbidding plateau or a torrent-carved ravine, lifts his thoughts

from the earth to the great Mystery that is worshipped under many names. We must not expect Wilde's

O lonely Himalayan height,  
Grey pillar of the Indian sky,

or

The almond groves of Samarcand,  
Bokhara, where red lilies blow;

but we cannot help remembering what use Marlowe made of the resonant names that reached him from the East. Mr. Hallows does not rise above the Gazetteer of India with such lines (p. 23) as "In Burma, in the district of Magwe." The seventh sonnet shows, however, that he has achieved a mastery over a difficult form of verse, and the simple opening lines, oddly enough recalling Dante, lead on to effective geological expression at the close. Elsewhere the "science" is a little clouded by such phrases as "molten fire" and "powers exhibited by flame in bygone time." The eleven words describing foliation in Sonnet XV. are accurate enough, but leave the layman somewhat cold.

*Ergebnisse der exakten Naturwissenschaften.* Herausgegeben von der Schriftleitung der *Naturwissenschaften*. Pp. iv+403. (Berlin: Julius Springer, 1922.) 10s. 5d.

THE first annual volume of this new review of the exact natural sciences covers an immense territory in a very thorough manner; and it is evident that this, and the future volumes, will be an essential requisite in every physical library. Astronomy, relativity, statistical mechanics, the vibrations of rotating shafts, Nernst's thermal law, radiation, contact potential, chemical kinetics, photochemistry, electrolytic dissociation, X-ray spectroscopy, crystal structure, atomic and spectral theory, the theory of band spectra, photoelectricity and photoluminescence, and the periodic system of the elements are treated by authorities who have contributed to the recent remarkable developments of the subjects with which they deal. In this initial volume most of the reviewers have attempted to give a general account of the present state of the subjects reviewed, and the bibliographies which accompany their papers appear to be very comprehensive. The latter should prove very valuable; they cover the ground up to 1922, and include work by English and American physicists, the value of which is fully recognised in the text. Future volumes will be devoted more specifically to progress made during the year under review, the object being to give a general view of the progress made without details of individual publications.

*Opere di Paolo Celesia.* Serie scientifica a cura di F. Raffaele della R. Università di Roma. Studi biologici. Con prefazione di Osvaldo Polimanti. Pp. xii+426. (Roma: Dr. G. Bardi, 1923.) n.p.

PAOLO CELESIA was born at Genoa in 1872 and died in Rome in 1916. He was attracted to the study of natural science and began his scientific training in the laboratory of comparative anatomy in Genoa, and soon took up the investigation of the sponge *Suberites* and its symbiosis with the hermit crab *Pagurus*, his account of which forms the first paper