

with typhoid fever when on a visit to the Liebig's that indirectly led to the invention of the world-famous "extract of meat."

The growing anxieties of a large and complex business at length compelled Dr. Muspratt to leave Germany in order to assist his father, and henceforth most of his life and energies were spent in his native city and its neighbourhood, varied only by not infrequent interludes of foreign travel, accounts of which form a considerable portion of his narrative.

But in spite of the constant demands upon his time and activities, owing to the changing and progressive character of manufacturing chemistry during the last few decades, Dr. Muspratt has found abundant opportunity to associate himself with the social, political, municipal, and intellectual development of Liverpool, and there have been few public movements of any importance in that city with which he has not been connected in greater or less measure. All this he sets out, with a pardonable pride, in this autobiographical record. His has been a singularly full, active, and useful life, of many and varied interests, fruitful in achievement and in unselfish personal service. The book is written in a simple, unaffected manner, with no pretensions to literary style. It has suffered in a very slight degree from the fact that the author's failing eyesight compelled him to seek the aid of an amanuensis. This doubtless accounts for the occasional misspelling of proper names and certain lapses in expression which ought not to have escaped the attention of the proof-reader.

T. E. THORPE.

#### STUDIES OF THE RESPIRATORY EXCHANGE.

*The Respiratory Exchange of Animals and Man.*  
By Dr. A. Krogh. Pp. viii+173. (London: Longmans, Green and Co., 1916.) Price 6s. net.

THE fact that Dr. August Krogh is perhaps better known in this country than any other foreign contemporary physiologist is chiefly owing to the attention which was attracted by his researches on the mechanism of the respiratory exchange. A treatment of the subject from this point of view might have been expected of one whose own work has been of such fundamental importance in this direction; such expectation is, however, not realised in the volume before us, for it contains no reference to this department of the author's labours.

The study of the respiratory exchange has now grown to be a large subject divisible into subsidiary branches, and the monograph deals only with a limited aspect of one of these, namely, the quantitative aspect of the material and energy exchanges of the body as judged by the criterion of the total respiratory exchanges. The influences of functional activity are not considered.

The work opens with a short, clear account of the significance of the respiratory exchanges, and of the principles involved in direct and indirect

calorimetry. The methods used in the investigation of the respiratory exchanges are described, and then follows the chief subject-matter of the volume. Great stress is laid throughout on the importance of referring all determinations of total respiratory exchange to a "standard metabolism," i.e. the metabolism of the organism when in a state of minimal functional activity, and the author ruthlessly sets aside the results of many admittedly interesting series of observations where this essential has not been observed.

The influences of various intrinsic factors and of chemical and physical factors are discussed, and then follows one of the most interesting chapters in the book, that on the variations in standard metabolism during the life-cycle. The sections of this chapter which deal with hibernation and that treating of the pupal life of insects are of first importance.

Some of the author's own work in this direction is highly interesting; for instance, he shows that by raising the temperature the duration of pupal life may be shortened even by two-thirds, yet in all cases the carbon dioxide produced during pupal life by unit weight of chrysalides is the same. The most diverse forms of animal life, from sea-urchin eggs to brooding pythons, are introduced to illustrate specific points, or to indicate useful lines for future work, the outlook being essentially biological.

The final chapter, which deals with the respiratory exchange in different animals of the same and of different species, shows careful treatment of results which are still very far from complete; the portion dealing with the relation of metabolism to surface and weight is logically dealt with. The bibliography is carefully chosen so as to present the pith of the very voluminous literature on the subject.

#### GNOMONICS AND CELESTIAL MOVEMENTS.

- (1) *Gnomonica: L'Orologio Solare a Tempo Vero nella sua Moderna Applicazione.* By G. Bottino Barzizza. Pp. viii+199. (Milano: Ulrico Hoepli, 1915.) Price 2.50 lire.
- (2) *Lezioni di Cosmografia.* By Prof. Giovanni Boccardi. Pp. x+233. (Milano: Ulrico Hoepli, 1916.) Price 3 lire.

(1) THIS is a short text-book on gnomonics, and is not intended for people who merely want to put up a nice sun-dial as an ornament in their garden or grounds. There is not a single picture of an article of that kind: only geometrical diagrams. The aim of the author is a much higher one, and has been well accomplished by showing how in careful hands a sun-dial may be used to control a clock sufficiently well for ordinary purposes. After explaining the diurnal and annual motion of the sun, the necessary formulæ are developed for tracing the hour-lines on horizontal and vertical dials and for correcting their indications for errors of adjustment. Convenient auxiliary tables are also given of the various