

The treatment of the dynamics of movement as a polar change in the resultant of the anabolic and katabolic processes in the cell, or "biotonus," as the author calls their algebraical sum, is equally illuminating, as are also parts of the mechanics of cell metabolism.

The pages dealing with actual facts, which after all make up by far the greater part of the book, possess an enticing feeling of freshness and novelty which is born of the fact that the author's special studies have lain out of the beaten track. For this and for the intrinsic interest of the facts themselves we feel grateful to him, and we heartily wish success to the English edition. The translation bears abundant evidence of the care which Prof. Lee must have lavished upon it. It is a monument of clearness throughout. W. B. HARDY.

OUR BOOK SHELF.

Living Pictures. By H. V. Hopwood. Pp. xii+275. (London: *The Optician and Photographic Trades Review*, 1899.)

THIS is a very interesting review of the gradual evolution of the various instruments which have been invented for the portrayal of objects in motion, from the earliest times to the present day. The work may be divided into two parts, of which the first, including Chapters i.-iii. (pp. 1-109) deals with the more distinctly historical aspect of the subject, while the remaining chapters (iv.-vii.) are devoted to a very minute description of all the important machines in present use.

Chapters i. and ii., on the "Persistence of Vision," &c., contain a lucid account of the principles governing the phenomenon of a succession of different views of the same object giving the impression of the object being in motion. In this part all the instruments, whether as toys or scientific apparatus, are described in the order of their invention, beginning with the simple colour tops and thaumatrope put forward as early as 1826. The host of improvements from this time up to about 1878 were attempts to remedy the difficulty of so small a percentage of light passing the two slits at first used for the intermittent view. This section concludes with descriptions of the modern microscope and viviscope.

Chapter iii. (pp. 43-109) commences with the invention of "chronophotography," and gives a complete description of the more important of the inventions brought out from 1865-1895. The mechanical details in connection with the alternate exposure and movement of the sensitive surface receive special attention, the difficulty of following these being greatly lessened by the numerous illustrations accompanying the text.

Chapter iv. is devoted to present-day apparatus, and all the machines which have appeared before the public receive ample notice, in most cases accompanied by a woodcut showing the internal arrangements.

Chapters v. and vi. deal with the processes adopted in making the films, their exposure, development, printing, &c., and also give ample practical instructions for exhibiting the pictures in the lantern.

At the end of the volume two most useful appendices are given. The first is a "Chronological Digest of British Patents," giving a short *résumé* of all specifications taken out in connection with living pictures from the time of Fox Talbot (1851) to the end of December 1898.

The second appendix is an annotated bibliography of all publications (British and foreign) from 1825 to the present time, which bear on the subject.

The numerous illustrations (242), which are well chosen and very clearly printed, render the following of the

necessarily somewhat technical matter exceedingly interesting even to the non-expert. The book will be welcomed by many to whom the methods of cinematography are a mystery, as by its aid any one even strange to the subject may easily understand the working of any of the machines in past or present use.

Tables and Data. By W. W. F. Pullen. (Manchester: Scientific Publishing Company, 1899.)

IN these eighty-seven pages Mr. Pullen brings together tables and data which will be found very serviceable in engineering laboratory work and in the solution of class problems and exercises in mechanical engineering. Points perhaps of special mention are that the general steam table is carried up to 300 lbs. per square inch; the diagram for determining the dryness of steam with the throttling calorimeter is plotted on a large scale, and the melting points of various substances has been revised by Sir William Roberts-Austen. For facility of reference the British and metric measures are placed side by side. The remaining portion of the book is devoted to mathematical notes on mensuration, geometry, trigonometry, &c., with a synopsis of mathematical data. At the end are added a few extra pages, some of which are blank, while on others are printed diagrams of millimetre paper, for the insertion of any additional curves the student may wish to insert. Not only engineering students, but others should find the contents of this book a useful laboratory *vade-mecum*.

LETTERS TO THE EDITOR.

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Halo Round a Shadow.

IN your issue of this week Prof. S. Newcomb draws attention to the halo which an observer often sees round the shadow of his own head when the ground on which the shadow falls is covered with vegetation or any obstructions which can themselves cast shadows.

In a letter to *NATURE* in 1878 or 1879 (I have not the reference by me) I mentioned this phenomenon, giving the same explanation as your recent correspondent, and adding that the angular width of the halo was settled by the ratio of the mean diameter of the obstructions to their distance from their own shadows.

The halo (or spot of light, if the observer is too far off for his own shadow to show) can be seen very well when the ground is covered with heather or bracken whose twigs and leaves are small compared to their height above the ground.

3 Victoria Street, S.W., October 6.

A. MALLOCK.

The Skull of Hatteria.

IT may be worth while to draw the attention of naturalists to an omission in the figures of the skull of that archaic reptile, the Tuatara, that occur in two recent text-books of somewhat wide circulation, viz. Parker and Haswell's "Text-Book of Zoology" and Reynolds's "The Vertebrate Skeleton." These figures are either copied or redrawn from Zittel's figure published in his well-known work on Palæontology. This figure appears to have been drawn from an imperfect specimen, as the "transverse" (or transpalatine) bone is omitted in the ventral view; it is *apparently* represented in the dorsal view, however, though there is no index line in the original. The bone, though of considerable size, very readily drops out of a thoroughly macerated skull, from which the figure was no doubt drawn. There is really no excuse for our English authors borrowing the figure from a German book in this instance, for Dr. Günther's picture of the skull published in the *Phil. Trans.*, vol. clxvii., is perfectly accurate, except in regard to nomenclature of some of the bones, while Zittel's is most indistinct.

Dunedin, N.Z., August 30.

W. BLAXLAND BENHAM.