## BOOKS RECEIVED.

SIGHT: An Exposition of the Principles of Monocular and Binocular Vision, by JOSEPH LE CONTE, LL.D., Professor of Geology and Natural History in the University of California.—D. Appleton & Co. New York, 1881.

This is another of those books specially prepared to bring within the reach of the general reader, some of the most interesting but complicated problems of science.

In the present case Professor Le Conte has attempted the double task of writing a work for the general public, which should also be found profitable reading for even the most advanced specialist. This would appear to be an embarrassing operation even with a popular subject, but with one so purely technical as optics the difficulties of the author must have been greatly increased.

To accomplish this programme with success, Professor Le Conte has divided his subject into two parts; the first treating, in an elementary manner, the anatomy and construction of the human eye, and the various theories involved in vision; and also a second part addressed to the specialist, in which some of the disputed points in Binocular vision are treated in detail.

Professor Le Conte, in speaking of the wonderful mechanism of the human eye, describes it as a masterpiece of Nature, whereas it is well known that many authors have been far less enthusiastic in its praise.

To show how differently two authors may treat the same subject even from the same point of view, let us compare what Professor Le Conte and Dr. H. Newell Martin says, as to the comparison of the human eye with a microscope objective, for curiously enough they both select the same object for this purpose, the former in the work now under review, and the latter in "The Human Body," a book recently received in our office, a notice of which is in preparation.

Professor Le Conte remarks, *"We see, then, that the mode of adjustment of the eye is somewhat like that of the Microscope." "Like the Microscope, but how infinitely superior."

Whereas, Dr. Martin observes: "The eye, though it answers admirably as a physiological instrument, is by no means as perfect optically; not nearly so good, for example, as a good Microscope objective."† Again Professor Le Conte, while indeed speaking of "defects of the eye as an instrument," refers such imperfections to a condition of disease or malformation, or at least to eyes which are not "normal or perfect," and specially mentions Myopy or Brachymetropy, Presbyopy, Hypermetropy and Astigmatism. Whereas, Dr. Martin points out defects of the human eye, which appear to be the normal condition of human vision, and exist "even in the best of eyes"—such as the "reflecting surfaces of our eyes not even being truly spherical, especially in the case of the cornea," and that "few persons are able to see equally clearly, at once, two lines crossing one another at right angles," this defect, when existing in a marked degree, causing serious trouble, amounting to disease, and known as "*astigmatism*."

In regard to the first part of the work, we may state that rarely has the subject been before treated in a manner so likely to realize in the mind of the student all that it is necessary to know in regard to the vision of man. The author's descriptions are so clear that to misconstrue them is impossible. Excellent illustrations are given, the majority being diagrams prepared by Professor Le Conte.

In regard to the more technical parts of the work relating to Binocular Vision, we find a difficulty in giving a resumé without diagrams, which it is not possible to present with this notice, but we trust we have aroused sufficient interest in this book to induce those studying the question to make direct use of Professor Le Conte's work, where the whole subject is explained.

Professor Le Conte's own views, however, on Binocular vision may be given, which are expressed in the following words:

"All objects or points of objects, either beyond or nearer than the point of sight, are doubled but *differently*. The former homonymously, the latter heteronymously. The double images in the former case are united by *less* convergence, in the latter case by *greater* convergence of the optic axes. Now the observer knows *instinctively and without trial*, in any case of double images, whether they will be united by greater or less optic convergence, and therefore never makes a mistake, or attempts to unite by making a wrong movement of the optic axes. In other words, *the eye (or the mind) instinctively distinguishes homonymous from heteronymous images, referring the former to objects*, successive combination of the different parts of the object or scene, or pictures, as maintained by Brücke." ‡

Professor Le Conte claims that this work "meets a real want, and fills a real gap in scientific literature;" in this assertion we heartily concur.

## CORRESPONDENCE.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

### A PROBLEM IN OPTICS.

*To the Editor of* "SCIENCE:"

Will some of your correspondents answer the following questions, not from any tables given in books, but by original computation or observation. Given a plate of crown glass, index of refraction 1.525, with parallel surfaces, a ray of light incident on the under-surface 38° from the normal.

What will be the direction of the ray *in the glass?* What will be its direction of emergence from the upper surface into air? What its direction into water? What percentage of the light will be lost by reflection from the under surface of the plate? What will be lost from the upper surface?

If the light is incident 45° from the normal, what is the answer to each of the above questions?

As each color of the spectrum has a different degree of refraction the medium ray should as usual be taken for computation.

The thickness of the plate cannot affect the refraction *in* the glass, only the point where the ray reaches the upper surface. CARL REDDOTS.

OZONE is absorbed in a solution of arsenious acid to which a little neutral potassium iodide has been added. The excess of arsenious acid is estimated with standard iodine solution. 1. Ozone is a constituent of the higher atmosphere to a much larger extent than near the earth's surface. 2. Ozone is destroyed by contact with the gases and organic matter in a moist atmosphere, as near the earth's surface, and that the collection of ozone from the air is attended by the destruction of it to a large extent. 3. The absorptive power of the ozone in the air is quite sufficient to account for the limitation of the solar spectrum. 4. The blue tint of the atmosphere is largely due to ozone.—W. N. HARTLEY.

## ERRATA.

*How to obtain the Brain of the Cat*, (Wilder).—Correction: Page 158, second column, line 7, "grains," should be "grams;" page 159, near middle of 2nd column, "successily," should be "successively;" page 161, the number of Flower's paper is 3.

* Sight, &c., page 45.

† The Human Body, page 502.

‡ Page 151.