Weierstrass, of the function defined by the series at an interior point of this circle. Likewise the series defines a function which is holomorphic at every point exterior to this unit circle and the circle is a natural boundary of the function thus defined. In the theory of Weierstrass there is no means of continuation by which one may establish a connection between the function defined by (1) in the interior of the unit circle and that so defined in the exterior of this circle. In fact, from the point of view of Weierstrass they are to be treated as unrelated functions.

Nevertheless Borel shows that a suitable continuation does exist for establishing the connection between these functions, this being constituted by a series of polynomials. In fact, one can form a series of polynomials

$$\sum_{p=0}^{\infty} P_p(z)$$

which converges uniformly on every finite segment of every straight line of argument $m\sqrt{2} + n$, where m and n are integers and $m \neq 0$, an infinity of which lines lie in every angle issuing from the origin; on each of these lines the series converges to the sum of the series in (1).

R. D. CARMICHAEL.

SHORTER NOTICE.

Elements of Optics for the Use of Schools and Colleges. By GEORGE W. PARKER, M. A. London, New York, and Bombay, Longmans, Green and Company, 1915. vi + 122 pp.

THE mathematical prerequisites necessary for reading this little book have been reduced to a minimum. A student whose knowledge of mathematics is limited to an acquaintance with elementary geometry, the solution of simple algebraic equations and a few fundamental propositions in trigonometry will be able to follow the treatment at all places. The knowledge of physical phenomena presupposed is also reduced to an extreme minimum. The book is therefore of a strictly elementary character. It is written in a satisfactory style and its material is arranged in interesting sequence, so that it may be

recommended to one who seeks pleasing applications of the most elementary mathematics to a chapter in scientific theory.

The chief merits of the exposition as an elementary treatment of its subject matter are intimately dependent upon the straightforward and simple manner of presentation on account of which the reader is able to follow the development with striking unity of effort and with little loss of energy consumed through divergent operations of thought. This renders the book particularly valuable for the learner who needs to concentrate attention upon the main issues in order to understand them thoroughly.

The effort to attain the advantages just mentioned has also led the author into the chief defects of his exposition. These are associated with the description of a special case as though it were the general case. Thus a lens is defined (page 56) as "a transparent body bounded by two spherical surfaces" and the student is left without any hint that lenses may also be of other forms. The most usual form of the kaleidoscope is described (page 13) as if there were no other form. A similar defect is in such a definition as that of optics (page 1) as "the science which treats of the properties of this mysterious agent" light, whereas the book itself deals with only a very narrow range of the properties of light and the student is given no hint of the more fundamental matters not treated in the book. The mathematical reader also feels a certain uneasiness in the free use of "infinity" (as on pages 84, 89, 113, and elsewhere) and in the uncritical use of processes of approximation. Nevertheless these minor defects do not obscure the real interest and value of this very elementary exposition.

R. D. CARMICHAEL.

NOTES.

THE fourth annual meeting of the Mathematical Association of America was held at the University of Chicago on Friday, December 27, 1918, in connection with the annual meeting of the American Mathematical Society. The morning programme included a conference on "Deductions from war time experiences with respect to the teaching of mathematics," a paper on "An experiment in supervised study," by D. R.