his work in the physical laboratory and acquire some facility in determining the accuracy and significance of his measurements.

A. DE FOREST PALMER

Electric Arcs. By CLEMENT D. CHILD, Ph.D., professor of physics, Colgate University. New York, D. Van Nostrand Company. 1913. Pp. 194.

A text of this kind must interest at least two classes of readers; those who wish to know more of the physics of the electric arc and those who are intensively engaged in arc lamp development. The author has digested the results of those investigations made since the publication of Mrs. Ayrton's "The Electric Arc," which contains a similar digest of the investigations made previous to 1898.

In the first six chapters the author discusses the relations between terminal voltage, current, resistance and E.M.F. of pure carbon, impregnated carbon, pure metal and metallic oxide arcs operated with direct and alternating current in air and in various gases at different pressures. This discussion also includes the performance of the mercury arc rectifier and the mercury arc lamp under various conditions.

The seventh chapter, headed "Photometry of the Electric Arc," contains information regarding the light-producing properties of various electric arcs and scarcely touches upon the measurement of light suggested by the caption. The following chapter contains a brief review of the use of the electric arc in wireless telephony. All hypothesis regarding the electric arc is reserved for the last chapter, where the author offers an explanation of certain arc phenomena in the ionic theory.

The book would take on added interest from the scientific viewpoint if it contained references to the action of electric arcs between metal terminals in liquids such as alcohol, mineral oil, carbon-tetrachloride, etc., or high tension arcs in air. Although the book title suggests a more general discussion the author pays more attention to the "light-producing electric arc."

The text includes an extensive bibliography to which detailed references are made at the appropriate place. The continuity of the discussion is increased by the results of the author's own investigations whenever the reports of others failed to reveal the required data. Thoroughness and presentation of many viewpoints characterize the text throughout. To the student interested in electric arc phenomena a careful reading of Mrs. Ayrton's text followed by that of Dr. Child should prove an invaluable foundation upon which to base further investigations.

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SCIENTIFIC JOURNALS AND ARTICLES

THE April number (Vol. 16, No. 2) of the *Transactions of the American Mathematical Society* contains the following papers:

L. E. Dickson: "Quartic curves modulo 2."

W. A. Hurwitz: "Mixed linear integral equations of the first order."

W. B. Fite: "Prime power groups in which every commutator of prime order is invariant."

W. A. Manning: "On the order of primitive groups, II."

J. W. Alexander, II.: "A proof of the invariance of certain constants of analysis situs."

A. B. Coble: "Point sets and allied Cremona groups (part I.)."

C. T. Sullivan: "Scroll directrix curves."

THE April number (Vol. 21, No. 7) of the *Bulletin of the American Mathematical Society* contains: "The rôle of the point-set theory in geometry and dynamics," by E. B. Van Vleck; "An enumeration of integral algebraic polynomials," by A. B. Frizell; "Mr. Paaswell's appeal to producing mathematicians," by C. N. Haskins; Review of Volterra's Leçons sur les Fonctions des Lignes, by G. A. Bliss; "Shorter Notices": Lehmer's List of Prime Numbers from 1 to 10,006,721, by L. E. Dickson; Whitford's The Pell Equation, by T. M. Putnam; Liebmann and Engel's Die Berührungstransformationen: Geschichte und Invariantentheorie, by T. H. Gronwall; Pasch's Veränderliche

und Funktion and Voss's Ueber das Wesen der Mathematik, by R. D. Carmichael; M'Lachlan's Practical Mathematics, by T. E. Mason; Klein's Elementarmathematik vom höheren Standpunkte aus, Teil II., Netto's Elementare Algebra, Gans's Einführung in die Vektoranalysis mit Anwendungen auf die mathematische Physik, and Rothe's Darstellende Geometrie des Geländes, by T. H. Gronwall; Borel's Le Hasard, Ingersoll and Zobel's Introduction to the Mathematical Theory of Heat Conduction, and Duhem's Le Système du Monde, Tome I., by R. D. Carmichael; Lecornu's Cours de Mécanique, Tome I. and Guichard's Problèmes de Mécanique et Cours de Cinématique, by W. R. Longley; "Notes," and "New Publications."

The May number of the *Bulletin* contains: Report of the February meeting of the society, by F. N. Cole; "The Legendre condition for a minimum of a double integral with an isoperimetric condition," by C. A. Fischer; "Note on the derivative and the variation of a function depending on all the values of another function," by G. C. Evans; Review of Sommerville's Elements of Non-Euclidean Geometry, by J. L. Coolidge; Review of Minkowski's Collected Works, by E. B. Wilson; "Shorter Notices": Bioche's Histoire des Mathématiques, by D. E. Smith; Richardson's Solid Geometry, by R. B. Robbins; Hall's Geometrical Vector Algebra, by F. L. Hitchcock; Prescott's Mechanics of Particles and Rigid Bodies, by W. R. Longley; Annuaire pour l'An 1915, publié par le Bureau des Longitudes, by E. W. Brown; "Notes"; and "New Publications."

The June number of the *Bulletin* contains: Report of the April meeting of the society at Chicago, by H. E. Slaught; "A geometric derivation of a general formula for the southerly deviation of freely falling bodies," by W. H. Roever; "Note on solvable quintics," by F. N. Cole; Review of the Madison Colloquim Lectures on Mathematics, Part I., by O. E. Glenn; "Some books on calculus" (Granville, Snyder and Hutchinson, Davis, Vivanti), by E. B. Wilson; "Notes," and "New Publications."

SCIENTIFIC RESULTS OF THE TERRA NOVA EXPEDITION

The British Museum has undertaken the publication of the Natural History results of the British Antarctic Expedition of 1910, better known as the Terra Nova Expedition. These results will be issued in parts as fast as they are prepared. The first part to be printed is a description of the fossil plants by Professor A. C. Seward of Cambridge.[1]

An especial interest attaches to the small collection of geological specimens that were retrieved after the tragic death of Captain Scott and his heroic associates, and the present publication bears ample testimony to the fact that their efforts have not only furnished the world with a lasting monument to British pluck and manhood but have also yielded facts of the greatest scientific interest.

Although determinable fossil plants are few in number traces were seen, as well as numerous carbonaceous laminæ and small seams of coal, at a number of widely separated localities, particularly in what is called the Beacon sandstone, which at latitude 85° S. is 1,500 feet thick. This comprises an upper 500 feet of sandstone resting on 300 feet of interbedded sandstone and shale with several seams of coal, underlain by 700 feet of similar sandstone conglomeratic at the base. The character of the grains in the sandstone suggests wind action, and sun cracks and ripple marks have also been observed. This extensive formation has been traced from Mt. Nansen as far south as latitude 85°, a distance of over 700 miles.

The most significant plants are those representing the genus *Glossopteris* found at Mount Buckley or Buckley Island which is situated just west of the Beardmore Glacier in latitude 85°. These are partly referred to the widespread *Glossopteris indica* Schimper and in part described as a new variety of that species. There are also represented objects identified as those of *Vertebraria* and representing the axial organs of *Glossopteris,* and others doubt-

[1] Seward, A. C., "Antarctic Fossil Plants," British Museum (Natural History) British Antarctic (Terra Nova) Expedition, 1910. Natural History Report. Geology, Vol. 1, No. 1, pp. 1–49, tf. 1–6, maps A–C, pls. 1–8, 1914.