racter of which is said to be somewhat similar to that of the *Bulletin*. Reviews follow of a work on the "Photochronograph (Hagen and Fargis, of the Georgetown College Observatory), and of Dr. Craig's "Treatise on Linear Differential Equations, vol. i. (by J. C. Fields). Besides there is a note on "Nomenclature of Mechanics" (our readers are familiar with the discussion raised by Prof. Greenhill, anent the same matter, the equation $W = Mg$). The "Notes" (in both numbers) give information respecting the Society and its doings. One property of numbers, out of many given, we give here—

$$4^5 + 5^5 + 6^5 + 7^5 + 9^5 + 11^5 = 12^5.$$

In No. 3 Dr. Fiske prints a *résumé* of a lecture, before the Society, "On the Doubly Infinite Products," which bristles with references to papers on the subject. Prof. Hathaway then, in a very interesting note on the "Early History of the Potential," sums up, in correction of an error that occurs in Todhunter's "History of the Theories of Attraction" (vol. ii. § 789, 1007, and 1138), "the evidence in favour of assigning to Lagrange" (as against Laplace) "the honour of the introduction of the potential into dynamics." Mr. J. E. Davies contributes a favourable review of Preston's "The Theory of Light."

To each number is appended a long list of new publications. This *Bulletin*, it will be seen, breaks new ground, and presents several points of interest to mathematicians.

Guide to the Examinations in Chemistry. By W. Jerome Harrison, F.G S. Pp. 56. (London: Blackie and Son.)

THE greater portion of this little book consists of answers to the questions which have been set in elementary inorganic chemistry in the examinations held by the Science and Art Department during the period 1884 to 1891. The rest of the book contains general information regarding the Department and its examinations, and also supplies hints for the successful working of the papers.

The answers are but moderately satisfactory; it may be taken that the author has frequently underrated the difficulty of expressing concisely, and at the same time clearly, the meaning which he wishes to convey. The following extracts may be taken as instances:—

"Gunpowder . . . . depends for its energy upon the suddenness with which the nitre parts with its oxygen."

"The terminations *-ide*, *-ite*, and *-ate* are given to the names of the acid-forming portions of salts."

"Nitrous water [oxide ?] dissolves in water equally, and as a whole. Air dissolves *unequally* in water, the oxygen being more soluble than the nitrogen."

The book is intended to be a companion to Sexton's "Chemistry, Theoretical and Practical."

Manipulation of the Microscope. By Edward Bausch. (New York: Bausch and Lomb Optical Company, 1891.)

THIS little treatise on the microscope, which is now in its second edition, is sure to find favour with workers with this instrument, as it forms a good introduction to books of a more advanced nature. The subject is not treated extensively, but just so far as to enable a beginner to know the whys and the wherefores of the various manipulations.

The first two chapters deal with the simple and compound microscopes, describing their adjustments, &c. Under "Objectives and Eye-pieces," which forms the heading of the next chaper, we find short but good descriptions relating to achromatism, resolving power, flatness of field, magnifying power, &c. In the chapters on "Requisites for Work," "How to Work," and "Advanced Manipulation," the beginner is shown how to set up his instrument, to illuminate the field properly, to use the high-power objectives, and, among other things, receives instruction in the dry and immersion adjustable objectives.

The selection of an instrument is always an important item to be thought of, and the author here gives some good sound advice both about it and the choice of its accessories, and about the care which should be bestowed on it to keep it in the best working condition. The appendix contains some considerations in the testing of objectives.

The work is one which all beginners with the microscope should read, while many a hint might be gathered by an advanced student.

Harrow Birds. By G. E. H. Barrett-Hamilton. (Harrow: Sold for the Harrow School Scientific Society by J. C. Willbee, 1892.)

THIS little volume ought to be of good service to the Harrow School Scientific Society, for whose benefit it has been prepared. The author was a member of Harrow School from 1885 to 1890, and evidently made excellent use of his opportunities for ornithological study. For facts which have not come within his own observation he has had recourse to the best authorities, and various gentlemen, whose names he gives, have contributed notes on the birds observed about Harrow during their school-life. The district covered in the list is contained within a radius of about five miles around Harrow. The list includes 197 species, of which 55 are partially or wholly resident, 27 are regular summer visitors, about 22 appear annually on migration or in winter, and the remaining 94 are visitors of rare or accidental occurrence. The species which breed regularly number 82.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Theory of Solutions.

IN NATURE, vol. xlv. p. 293, appears a letter by Prof. Ostwald, in which he replies to a portion of my review of his book on solutions (NATURE, vol. xlv. p. 193).

Prof. Ostwald finds his main cause for objection in my conclusion that he is a supporter of the "physical" as distinguished from the "chemical" theory of solution. To such a statement he objects on the ground that he "cannot at all admit the existence" of a "contrast" between the two theories; and further that he intentionally neither set up nor attempted to answer the question—Is solution a physical or a chemical process?—because he holds it to be "unclear and therefore very harmful." In the rest of the letter he concerns himself mainly with expounding what he prefers to name the "new theory" of solution, and seeks to show that between it and the hydrate theory there is no antagonism or rivalry.

The first point to consider as bearing on the question at issue is the definition of the "new theory" which may be gathered from extracts such as the following:—

"The theory of solutions which I represent and defend consists" "of a certain number of laws, *i.e.* of exact relations between measurable quantities."

"The presentation of laws of solutions, as known up to the present, . . . forms the subject of my book."

But surely it cannot be admitted that a number of exact relationships constitute a theory; for theory is concerned with saying why such relationships should exist, with supplying ideas to connect them together. Now, contrary to the apparent meaning of the last quotation given above, Prof. Ostwald's book contained much of the nature of a true theory. Indeed, the ideas which seemed to determine the general treatment of the subject, and which formed the only justification for the free use made in the book of gaseous laws, were the hypothetical functions ascribed to the solvent and the dissolved substance. The hypothesis here involved, in conformity with what has been the usual custom in this country I termed the "physical theory," and I am at a loss to see how any reasoning based on the definition of the "new theory" affects the use of this term. For the theoretical matter given in the book evidently refers