

from the perfection of our means of research, we are apt to lose in independence and vigour of mind, to say nothing of the time which is wasted in the weary wading through piles of periodicals, often with but little fruit as the result. Mathematicians know that solving problems gives a strength to the mind which cannot be obtained from the most careful study of book-work, and I have often ventured to think that to write the section on the "literature of the subject" as the last stage of a research is not so much to "put the cart before the horse" as it seems. Something, too, may be lost through the very perfection of the means of research in natural history: the mind may be tempted to dwell too much on details; and the over-careful study of these may lead men to miss the greater principles. Darwin was an observer, precise and minute as any, but it is interesting to note that he was always guided by a selective principle.

The greatest charm of the "Life" is that it draws so vivid a picture of the man himself—partly from the unconscious self-portraiture of his letters, partly from the tender touch of his son's hand, aided by the loving memories of other members of his family. Before us rises that tall, slightly stooping form, either walking with swinging though often feeble step, cloaked and staff in hand, along the "sand walk," or seated or reclining in that study which bore silent testimony to the orderly habits learnt in the tiny cabin of the *Beagle*; we see that massive forehead, those keen yet kindly eyes, shadowed by those overhanging brows, the sparse gray hair, the long gray beard, that winning smile which lit up those rugged features; we hear once more the kindly voice; but better still, there rises, fresh and ever instructive, the memory not only of one of the grandest intellects, but also of one of the noblest and truest natures, among the sons of men. Unruffled by carping criticism and virulent abuse, in silent dignity Charles Darwin laboured on, in the quiet consciousness of strength and the conviction that truth would at last prevail. No one can read the life of Darwin without feeling as if some healthful air from a better world had braced his moral fibre and nerved him for more earnest and more unselfish work.

Truly the last scene of all was a "Great Lesson." His family would have laid him in the quiet churchyard near his own home, but his fellow-workers in science desired and obtained that his grave should be made in Westminster Abbey. Some quarter of a century before that day many thoughtful men hesitated in accepting, or even opposed, the views which he had maintained; while the camp-followers and swash-bucklers of the religious world had discharged at him their volleys of vituperation. The one had been for the most part persuaded; the other had slunk away to growl in obscurity. Now, around that grave in the Valhalla of Britain, were gathered the leaders in literature and science, men of every rank in life, of every form of creed—from the most sincere Christian to the no less sincere Agnostic. Time had shown that there was no necessary opposition between the inductions of science and those deeper aspirations and beliefs upon which we must not here touch, and men who on such points felt deeply but differently from Charles Darwin came no less willingly than others to pay the last honours to one who was not only a great philosopher but also emphatically a good man.

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OUR BOOK SHELF.

A Treatise on the Integral Calculus. Part I. Containing an Elementary Account of Elliptic Integrals and Applications to Plane Curves, with numerous Examples. By Ralph A. Roberts, M.A. (Dublin: Hodges, 1887.)

MOST students, on taking up this book, will be disposed to ask, "Is there any room or necessity for another work on the Calculus just now? Is not Williamson up to date?" Mr. Roberts gives no sign, and so we are led to search out for ourselves a reason for the existence of the work, and a justification of the same. In his two previous books our author makes great use of elliptic functions, and a chapter is devoted to the discussion of them in the book before us, and, further, this fact is prominently noted on the title-page; hence we conclude that Mr. Roberts has had in view mainly the treatment of these integrals, and to make his treatise self-sufficient he has surrounded this special subject with such preliminaries and accessories as he deems suitable for the elucidation of his theme. The author has produced a capital book, for he writes with extreme care, and full knowledge and command of his subject. There appears to us to be in many parts a novel treatment—*i.e.* considering the matter in the light of English treatises on the Calculus—and there is copious illustration. There is large opportunity for practice afforded by the numerous examples inserted in the body of the work, and also at the end. Many of these are not intended, or at any rate are not suitable, for babes; they are strong meat for adults. There is an index and the usual table of contents.

Solutions to Problems contained in a Treatise on Plane Co-ordinate Geometry. By I. Todhunter, F.R.S. Edited by C. W. Bourne, M.A. (London: Macmillan and Co., 1887.)

THIS is not a work brought out with a rush, for the greater portion of the solutions were drawn up by the author fifteen years ago. To students using the text-book this will be a valuable companion, for Mr. Bourne has executed his task with care and ability. Geometrical as well as analytical solutions are given, and impart a pleasant feature to the book. For Mr. Bourne's sake we regret that the foundation is giving way, as few students now read the "Conics," for that fate is befalling it which the author himself says is "the fate of all academical text-books," *viz.* obscurity ("W. Whewell," vol. i. p. 24). Todhunter's own views respecting "Printed Solutions" are given in his "Essays" (p. 81). The exercises, however, will retain their utility as tests for ascertaining a pupil's grasp of the subject, in spite of the decay of the setting, and the "Solutions" we can recommend to students "after a vigorous effort has been made to obtain the solution without the book."

Lectures on Bacteria. By A. De Bary. Second Improved Edition. Authorized Translation by Henry E. F. Garnsey. Revised by I. B. Balfour, F.R.S. (Oxford: Clarendon Press, 1887.)

THIS work is in the main an abridgment of a number of lectures, some of which were delivered in a connected series as a University course, others as occasional and separate addresses. The author's aim is to set forth the present state of our knowledge respecting the objects included under the name of Bacteria. Having dealt with cell-forms, cell-unions, and cell-groupings, he describes the course of development of Bacteria, and then proceeds to discuss questions as to the position of Bacteria in the organic world, and as to their origin and distribution. A chapter on vegetative processes is followed by one on the relation of Bacteria to, and their effect upon, their substratum; and this leads to an account of the forms which excite fermentation, and of parasitic Bacteria. The remaining chapters are on the harmless parasites of warm-blooded animals, on anthrax and fowl-cholera, on the