REVIEWS

Edited by DAVID E. ROWE

All books, monographs, journal articles, and other publications (including films and other multisensory materials) relating to the history of mathematics are abstracted in the Abstracts Department. The Reviews Department prints extended reviews of selected publications.

Materials for review should be sent to the editor of the Abstracts Department, Prof. David E. Zitarelli, Department of Mathematics, Temple University, Philadelphia, PA 19122, U.S.A. Russian-language publications should be submitted to Professor Esther R. Phillips, Herbert H. Lehman College, Bedford Park Blvd. West, Bronx, NY 10468.

Most reviews are solicited. However, colleagues wishing to review a book are invited to make known their wishes. Comments on books, articles, or reviews should be submitted to the Correspondence Department. We also welcome retrospective reviews of older books. Colleagues interested in writing such reviews should consult first with the editor to avoid duplication.

Ada: A Life and a Legacy. (MIT Press Series in the History of Computing, Vol. 3). By Dorothy Stein. Cambridge, MA/London (The MIT Press). 1985. xix + 321 pp. $9.95.

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The myth surrounding the mathematical talent and achievements of Augusta Ada Byron, Countess of Lovelace (1815–1852), stems largely from the autobiography of her friend, Charles Babbage (1791–1871). Now widely hailed as an early pioneer of the computer, Babbage wrote his autobiography late in life as he reflected on his struggles to gain acceptance of and support for his calculating machines. One who showed interest and enthusiasm for his work was the youthful Ada Lovelace. According to Babbage

> . . . the late Countess of Lovelace informed me that she had translated the memoir of Menebrea [an account of Babbage's Analytical Engine written by L. F. Menebrea in 1842 and translated by Lovelace in 1843]. I asked why she had not herself written an original paper on a subject with which she was so intimately acquainted? To this Lady Lovelace replied that the thought had not occurred to her. I then suggested that she should add some notes to Menebrea's memoir; an idea which was immediately adopted.
> We discussed together the various illustrations that might be introduced: I suggested several, but the selection was entirely her own. So also was the working out of the different problems. . . . The notes of the Countess of Lovelace extend to about three times the length of the original memoir. Their author has entered fully into almost all the very difficult and abstract questions connected with the subject. [Babbage 1864, 136]

From this mention of a translation with notes of an article on Babbage's computing machine, her only mathematical publication, the myth of Lady Lovelace grew,

adding to her credit the discovery of binary arithmetic and its application to computers [Rosenberg 1969, 71] and even the authorship of the first computer program (pp. x–xi). Greater legends have certainly sprung from fewer real facts. Drawing almost exclusively from manuscript sources, Dorothy Stein dispels the myth of Ada Lovelace in her enjoyable book, *Ada: A Life and a Legacy*.

Born the first and only legitimate child of the Romantic poet Lord Byron, Lady Lovelace found herself surrounded by a certain mystique from the start of her life. When Ada was barely one month old, her mother, Anne Isabella Milbanke, Lady Byron, successfully arranged not only a separation from her poet husband but also his effective renunciation of parental rights to his daughter. Lady Byron was a clever and calculating woman who had gained, and meant to maintain, control over her daughter's life. The consequences of this maternal domination, which continued through Ada's married life up to the time of her death in 1852, were far from happy. Stein chronicles this aspect of the story in particularly vivid detail.

No less thorough is her analysis of Lady Lovelace's intellectual and mathematical development. Like her mother, Lady Lovelace manifested an interest in mathematics and science early on and corresponded with her mother's old tutor, the mathematician William Frend. In 1833, at the age of 17, she met Babbage at a demonstration of one of his calculating machines. Over the next decade her circle of acquaintances continued to grow, gradually including the scientific expositor Mary Somerville and the mathematician Augustus DeMorgan. Judging from the extant correspondence, Ada used these two new friends in particular as sounding boards for her mathematical queries. Thus, in letters to Somerville, Ada struggled with algebraic substitutions (pp. 55–56) while in notes to DeMorgan, she tried to grasp the rudiments of the Continental style of differential and integral calculus in spite of her algebraic deficiencies. In 1842, for example, she wrote to DeMorgan in exasperation over her inability to verify that the function $f(x) = (a^x + a^{-x})/2$ (for a nonzero real number a) satisfies the functional equation $f(x + y) + f(x - y) = 2f(x)f(y)$. In her words: "I do not know when I have been so tantalized by anything, & should be ashamed to say *how* much time I have spent upon it, in vain. These functional equations are complete Will-o-the-Wisps to me" (p. 90).

As Stein shows, problems at this level stymied Lady Lovelace routinely. Furthermore, the manuscript sources indicate that Ada's one claim to scientific fame, the set of notes accompanying her translation of the article on Babbage's machine, was written in constant consultation with Babbage himself. At virtually every mathematical turn, Babbage guided and corrected Ada's work. The portrait which finally emerges from Stein's study reveals not an important 19th-century contributor to the development of computing but rather a woman, well-connected in the early Victorian scientific community, whose interests and ambitions outdistanced by far her abilities.

REFERENCES

Babbage, C. 1864. *Passages from the life of a philosopher*. London: Longman, Green.

Rosenberg, J. 1969. *The computer prophets*. New York: Macmillan Co.