"collaborators," plus many part time). It is hardly necessary to comment on the meagerness of our own facilities.

Until recently, even reviews and abstracts of Russian literature were pitifully sparse, although here there has been vast improvement. The original Kantorovich-Krylov has been known and appreciated by a few Americans, probably largely due to informal publicity given it by George Forsythe, who encouraged the making and publishing of the present translation. But *Mathematical Reviews* has no review of the second edition, published in 1941, and for the third edition it listed chapter headings and remarked, in an unsigned article, only that the edition differed very little from the previous one.

At any rate, we can be grateful to translator and publisher for the present volume. The book itself is concerned mainly with the numerical solution of partial differential equations, as the title to the first edition (1936) indicated. The first chapter deals with expansion in series, both orthogonal and nonorthogonal, with a section on the improvement of convergence. Next come methods of solution of Fredholm integral equations with applications to the Dirichlet problem. Then comes a chapter on difference methods, and one on variational methods. This accounts for slightly more than half of the book. There follow two chapters, for a total of nearly 250 pages, on conformal methods, and finally about 50 pages on Schwarz's method. Throughout, the presentation is extremely readable, with the inclusion of numerous examples, but no exercises. Unfortunately there is no index, either, although the table of contents is fairly detailed (5 pages).

In organization the translation deviates from the original only in collecting the references at the end, with footnotes referring to author and number. This I consider to be desirable. In detail the translation is faithful and quite clear. At times the phraseology is too faithful for elegance, and on rare occasions the translator is even led astray. One such example occurs on page 7: "Just as there, we may separate the problem into two, and moreover in each case the conditions are null on two sides." While the reader should understand what is meant, there are two faults to find here. First, "pričem" should be translated as "where," not "and moreover." Second, a condition cannot be null. I confess, I do not understand the construction in the original, which is "usloviya nulevye," and perhaps the translator can be forgiven for assuming the adjective to be in predicate form in spite of the ending. Perhaps the authors themselves were careless.

But one could always find fault with details, whereas the important thing is that the book is now available to readers of English. Again our thanks to publishers and translator.

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25[Z].—FRANZ L. ALT, *Electronic Digital Computers*, Academic Press, New York, 1958, x + 336 p., 23 cm. Price $10.00.

In the preface to his book, Alt addresses himself primarily to "physicists, chemists, engineers and others in similar occupations who have occasion to require the solution of computational problems by means of digital computing machines."

Alt's primary motivation with respect to this audience is to provide sufficient introductory information to improve communication between the "originator of a computing problem and the team around the machine."

The Introduction, Part I, leads the reader gracefully toward Alt's objectives with a well formulated statement of the stages through which a problem goes on its way to the number factory. Having outlined the required process of problem formulation to problem analysis to programming to coding to machine computation, the author proceeds to discuss the process in reverse. Thus, Part II provides a functional survey of automatic digital computers and Part III discusses programming and coding. By the time the object audience reaches more familiar ground in Part IV (Problem Analysis) and the statement of computer applications in Part V, it has gained the hindsight necessary to make modern computing methods more palatable.

The historical survey of automatic digital computers in Part II is somewhat weakened by the selection of the memory type as a principal classification characteristic. The more significant factor. of operation time, or conceptual factors such as the stored program are therefore undermined. However, the bulk of Part II adequately introduces the key factors differentiating one machine from another, that is, number representation and memory, arithmetic, control and input-output organs. The reviewer felt a lack of graphical presentation of the material in Part II—the inclusion of so much data in the same form as the normal prose is likely to lose the reader for whom this book is written.

Part III remains consistent in its reverse discussion of programming and coding, by describing coding first and then programming. A 4-address instruction set is defined and the coding of a simple arithmetic expression and trigonometric function is used as a vehicle for explaining coding operations. Single address coding is also described in the terminology of IBM manuals. The sections on programming demonstrate the use of flow charts and define factors and terminology significant to computing tactics.

Part IV, covering problem analysis, is by far the strongest part of the book. It collects, in very readable form, methods of computation used in numerical solution of ordinary differential, partial differential, and algebraic equations. As mentioned in the preface, there is no attempt at rigor in this presentation. The discussion of numerical methods is well seasoned with qualitative comments reflecting computational experience and with references to the 210 papers listed in the appended bibliography.

This book cannot by itself serve as a text for the classroom. This book will not serve as a reference textbook in the sense of its cataloging completeness. However, it is this reviewer's feeling that *Electronic Digital Computers* will be found on reference shelves for many years, by virtue of its very readable presentation of Alt's extensive experience in high-speed computation. The goal, established in the preface, is very adequately achieved.

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