ous areas of work in this field. These are to be written in non-technical language, so as to be easily understood by specialists in areas other than those of the writer.

The present volume contains six articles by well-qualified authors in six significant and interesting areas of work related to computers. Four summarize progress to date in the application of computers to weather prediction, translation of languages, playing games, and recognition of spoken words. Two are related to techniques used in computer programming and design. The titles and authors are:

1. General-Purpose Programming for Business Application—Calvin E. Gotlieb
2. Numerical Weather Prediction—Norman A. Phillips
3. The Present Status of Automatic Translation of Languages—Yehoshua Bar-Hillel
4. Programming Computers to Play Games—Arthur L. Samuel
5. Machine Recognition of Spoken Words—Richard Fatehchand
6. Binary Arithmetic—George W. Reitwiesner.

Since most of the areas of work covered by the papers in this volume are in a rapid state of flux, the assignment to write survey papers in these areas, undertaken by the authors, is a most difficult one. Each author has proceeded to carry out this assignment in his own characteristic manner. Thus, Gotlieb attempts to present a factual summary of some of the programming procedures used at present in processing data for business applications; whereas, Yehoshua Bar-Hillel presents a critical evaluation of the various efforts conducted in the field of automatic translation of languages—at times, highly critical. A large part of the material covered is admittedly subjective, and bears the imprint of the writers' points of view and contributions. Nevertheless, the six papers in this volume constitute authoritative surveys of the areas of work discussed. Together with the bibliographies given at the end of each paper, these articles will be valuable to the new researcher in the fields covered, as well as to the interested layman who wishes to familiarize himself with the exciting advances in computer technology.

H. P.

59[Z].—ANDREW D. BOOTH, *Automation and Computing*, The Macmillan Co., New York, 1959, 158 p., 21 cm. Price $5.00.

This book is intended mainly for the educated layman. In it the author attempts "to bridge the gap between the superficial accounts of electronic computers and automation . . . and the specialists' monographs. . . ." He has given an admirably written and lucid account of digital and analogue computers. His three chapters on the logical design of digital computers, the physical basis of this design, and programming for digital computers are very clear and informative, though concise.

The three chapters on automation in clerical work, control of continuous processes, and automatic machine tools and assembly processes are not as well done as the first three. The well-educated layman will have to expend a great deal of effort in order to follow the discussion in these chapters.

The last two chapters entitled "Strategic and Economic Planning" and "Non-numerical Applications of Computing Machines" are very brief. The former is much too short to give the reader more than a glimmer of what is involved in game theory. The last chapter furnishes a well-written introduction to methods for non-

numerical applications of computers, but, because it is so short, leaves the reader wishing the author had devoted more space to this subject. This reader would have preferred to have the author do this and omit some of his pronouncements on government (for example, the discussion on page 20 beginning with "Democratic government, too, is an example of Man in decay, . . .").

There are a few typographical errors in the book. The most disturbing one appears on page 36 where the binary addition table has the entry

$$1 + 1 = 1 \text{ (carry 1)}.$$

A. H. T.

60[Z].—ROBERT H. GREGORY & RICHARD L. VAN HORN, *Automatic Data-Processing Systems*, Wadsworth Publishing Co., San Francisco, 1960, xii + 705 p., 23 cm. Price $11.65.

This introductory book on automatic data-processing systems (ADPS) is a revision of a text which was used in management development courses sponsored by the Army Ordnance Corps. The affirmative objective is to instruct, enlighten, and inform management on the developments, techniques and applications of methods in management science, mathematics, and large-scale computing for the solution of today's complex business problems.

The book is divided into seven parts and three appendices. In Part One, "Orientation," the principles of basic computer programming are elucidated by means of a hypothetical computer which embodies an instruction repertoire of several existing machines. Various numerical and alphanumerical coding systems for storing data on punched cards, punched paper tapes, and magnetic tapes are also discussed here.

Part Two, "Automatic Equipment," deals with input-output hardware, storage devices, arithmetic and control units. The section concludes with a synopsis of the salient characteristics of approximately twenty computing systems: speed, storage, instruction repertoires, tapes, and peripheral equipment.

Advanced programming techniques and systems provide the subject matter of Part Three, "Programming and Processing Procedures." In this section the authors present a synthesis of the pros and cons of automatic programming and integrated data processing, two important and topical subjects.

The role of the data-processing unit in "management information systems" is the theme of Part Four, "Principles of Processing Systems." Several methods are suggested for selecting from a welter of available facts the pertinent information for effective executive decision-making. The reporting-by-exception principle is described in detail. Since the efficacy of the final system design is inextricably related to economic considerations, the authors analyze the major factors for determining the cost of obtaining and processing data, and explore the concept of the "value" of information in relation to its cost. The last chapter in Part Four outlines the broad principles underlying systems analysis and design.

Factors that affect the organizational structure of data processing are subject to examination in Part Five, "Systems Design." In particular, considerable attention is devoted to problems associated with centralized data processing and decentralized