grammed, as well as an account of its accomplishments and limitations. In discussing integration and differentiation, it might have been worthwhile to emphasize that integration is a smoothing process whereas differentiation brings out all the unpleasant features in a function and should, therefore, be avoided on computers.

The authors conclude by looking at the future of computers. Their discussion is pertinent and interesting, but it is limited to improvements of components and of existing computers. It might have been worthwhile for them to indicate that the very high computing speeds required for certain problems are likely to lead to the design of parallel processing digital computers.

In conclusion, it seems to me that this book would be a valuable adjunct for beginning students in computer programming. It should give these students a pretty good idea of what can and cannot be done with various computers. For the general reader, its value is questionable.

If they have knowledge of elementary differential equations and preferably some acquaintance with circuit theory, *Electronic Analog Computer Primer* is an excellent introductory text for those who wish to learn how to use analog computers. The authors clearly and concisely explain how to perform the operations of addition, subtraction, multiplication, and integration and display the circuits required for these operations, together with the symbols used for such circuits. This will permit the reader to follow current literature. They wisely point out the difficulties involved in using analog computers for differentiation and advise that such use be avoided. Time and magnitude scaling are clearly explained together with the limitations encountered in using various methods of magnitude scaling. The authors discuss certain problems and their solutions in detail, and also provide a list of problems from various fields.

Reading alone is not sufficient. Those who wish to learn how to set up and solve problems on an analog computer would be well advised to use this text in connection with an analog computer and to solve problems of increasing complexity as they read the text. The book is so clearly written that it could well be used for self-education by anyone interested in this field.

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Sources of Science Series

Kepler's Conversation with Galileo's Sidereal Messenger. Translated, with an introduction and notes, by Edward Rosen. Johnson Reprint Corporation, New York, 1965. xix + 164 pp. $9.

The transition from observations made with the naked eye to those made with the aid of a telescope was sparked by Galileo's observations recorded in 1610 in his *Sidereal Message*. At Galileo's request, Kepler described his reaction to that booklet in a letter dated 19 April 1610, which Kepler shortly thereafter amended slightly and published. This revision is now available in a complete English translation. It illuminates the transition.

At a time when many were skeptical of Galileo's discoveries, Kepler unquestioningly accepted them as a contribution to astronomy and concerned himself with their significance. Edward Rosen contrasts the practical Galileo with the imaginative Kepler, whose fancy carried him far beyond known, or even suspected, fact. Kepler, an ardent supporter of the heliocentric theory, had already speculated on the nature of the moon and of the stars and on the size and structure of the universe; he had just published his *New Astronomy*, had already described lenses and systems of lenses, and could supply the theory behind the telescope.

Among the topics considered are Jupiter's satellites and the cosmological considerations they entailed, the optical problems involved in the construction and use of a telescope and in the crystalline lens of the eye, earthshine, the moon (its surface, mountains, density, possible atmosphere, and motion), the sun (its brightness, parallax, and rotation), and the number and nature of the stars and whether they are self-luminous. And behind these considerations lay the role of the telescope and what might still be hoped for from that instrument.

Not only is Rosen a careful and accurate translator, but he is also a keen scholar with a broad and deep knowledge of Kepler's times. He is thoroughly familiar with Kepler's works and correspondence, the books that Kepler knew, and the books about Kepler. Rosen uses his wealth of knowledge to annotate the book. The notes do much more than furnish the reader with translations of pertinent passages from the writings of Galileo, Kepler, and others. They give the book its proper perspective.

Unfortunately, this scholarly apparatus makes the book cumbersome. To the seven pages of introduction and 49 pages of text are added 104½ pages of notes, two pages on which certain notes are continued, and a useful six-page index. The number of notes, and thus the number of times the reader is interrupted, could be greatly reduced by not pointing out individual mistranslations in Bryk's 1918 German translation. These notes distract the reader by introducing erroneous ideas. Similarly, references to errors made by others might be omitted. Nonetheless, the volume is most valuable, interesting, and enlightening.

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The Caravan City of Timbuctoo

The Primitive City of Timbuctoo. Horace Miner. Doubleday, Garden City, N.Y., revised ed., 1965. xxiv + 334 pp. Illus. Paper, $1.75.

The Primitive City of Timbuctoo is an anthropological account of the people of Timbuctoo, the famous caravan city that became a center of considerable importance as a trading point between North Africa and the savannah lands across the Sahara in the early 14th century. The account is based on 7 months of research carried out in 1940 when Timbuctoo was still a part of the French West African empire. Miner planned his research as a test of some of Robert Redfield's hypotheses about the folk-urban continuum and the nature of urbanism. He chose Timbuctoo because it was an Islamic city, founded for and sustained by trade, and little touched by Western urban ideas deriving from the Industrial Revolution.

Since 1940, a great deal has been published on the various peoples of Mali who contribute to the population of the city, and a good deal has been published about the political and economic history of the savannah region in general. There has also been a major political revolution in which Mali has become independent of France. Some 25 years of technical, social, economic, and political change separate the Tim-