The contribution by Howell Williams, "Geological observations on the ancient human footprints near Managua, Nicaragua," differs from the other papers in that it is a critical and definitive review of all the evidence to date bearing on the fascinating but complicated problem of deciding when the footprints were made. After the footprints came to the attention of the scientific world in the latter part of the 19th century, a controversy raged, with many taking the side of the archeologist Flint, who claimed that they "were at least 50,000 years old, and might be 200,000." After the present painstaking study of the geology of the region, and after taking into account such evidence from fossil remains and human artifacts as has been adduced, Williams is forced to the conclusion that the footprints are not less than 2000 and probably not more than 5000 years old.

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Theory of Functions of a Complex Variable. vol. I. C. Carathéodory. Trans. by F. Steinhardt. Chelsea Publ., New York, 1954. xii + 301 pp. Illus. $4.95.

The past few years have witnessed a good deal of activity in the translation of mathematical books and monographs into English. The list of outstanding books in the theory of functions of a complex variable available in English has been increased this last year by the monograph of Saks and Zygmund and now by the first volume of the *Theory of Functions,* by Carathéodory. It was with considerable excitement that the news of the original appearance of Carathéodory's *Funktionentheorie* was greeted by the mathematical public in 1950. The theory of analytic functions had been an ever-recurring theme in the research of Carathéodory. His contributions were many and significant. His monographs that had appeared hitherto (*Real Variable Theory, Calculus of Variations, Conformal Mapping*) were all of striking originality. The *Funktionentheorie,* from the time of its appearance, has had a warm reception, and its importance certainly justifies the pride that Carathéodory himself felt in his accomplishment.

The translation of this work by F. Steinhardt now renders it available to a large scientific public. In its present form it should be useful as a textbook in a course in the theory of functions of a complex variable and as a reference work in a scientific library. The first volume is elementary in scope and, of course, looks forward to the more sophisticated second volume.

The author has frankly omitted certain topics in the interest of not expanding the textbook unduly. From one point of view, the most serious omission is a systematic account of the theory of analytic continuation (however, the monodromy theorem is treated). Although the lacuna can be made up by reference to the masterful account of Saks and Zygmund, it would have been of great interest to see a treatment of this theme by Carathéodory. On the other hand, the treatment of the geometry of circles (unlike that of most books on the theory of functions of a complex variable) is extremely extensive. The justification for this elaborate treatment lies both in its pedagogic utility as an introduction to the theory of functions of a complex variable and in its value as an instrument of investigation. Other special features worthy of note are the systematic use of spherical distance (Ostrowski), the theory of normal families, and the early introduction of the Poisson integral.

An idea of the scope of the book may be had from the following summary of its contents.

> Part one: "Complex numbers from the algebraic point of view"; "Geometry of complex numbers"; "Euclidean, spherical, and non-Euclidean geometry." Part two: "Convergent sequences of numbers and continuous complex functions"; "Curves and regions"; "Contour integration." Part three: "Foundations of the theory"; "The maximum-modulus principle"; "The Poisson integral and harmonic functions"; "Meromorphic functions." Part four: "Continuous convergence"; "Normal families of meromorphic functions"; "Power series"; "Partial fraction decomposition and the calculus of residues." Part five: "The exponential and trigonometric functions"; "The logarithm and the general power function"; "The Bernoulli numbers and the gamma function."

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Wave Motion and Vibration Theory. Proc. of Symposia in Applied Mathematics of the American Mathematical Society, vol. V. Albert E. Heins, Ed. McGraw-Hill, New York–London, 1954. v + 169 pp. Illus. $7.

This book contains a collection of 15 addresses on wave motion and vibration theory delivered at the fifth symposium on Applied Mathematics of the American Mathematical Society, held at Carnegie Institute of Technology, 16–17 June 1952. It reports the mathematical methods and the latest advances in many diverse fields of wave motion and vibration theory. These 15 papers can be grouped into approximately four broad categories:

Stability of fluid motions. C. C. Lin, "Hydrodynamic stability." A critical discussion of the linearized theory of stability of laminar parallel or nearly parallel flow is given. Many controversial points on this linearized theory are clarified. S. Chandrasekhar, "Examples of the instability of fluid motion in the presence of a magnetic field." The difference of effects of magnetic field on the thermal instability of a horizontal layer heated below and the rotational instability of viscous flow between rotating cylinders is discussed. Without magnetic fields, these two problems of instability are quite similar.

Hydrodynamic waves. P. R. Garabedian, "On free-surface flows." Researches on axially symmetric cavitational flow are reviewed. W. Bleakney, "Review of significant observations on the Mach reflection of shock waves." N. W. McLachlan, "On a nonlinear differential equation in hydraulics." The nonlinear differential equation that oc-