the era of quasi-geostrophic, or "balanced," hydrodynamic frameworks. Since then, considerable progress has been achieved with primitive equation hydrodynamics, i.e., where the sole filtering approximation is that of quasi-hydrostatic equilibrium.

The volume's interest is therefore mainly historical. However, it will have an additional attraction to the meteorological community of the western world. Despite the author's attempt to maintain a broad perspective of contributions, it is, as one might expect, weighted toward the Soviet literature—and yet one can make a virtue of this inevitable necessary characteristic. The volume provides one with a self-critique of significant Soviet scientists and of their progress that may be difficult to glean from the large volume of Soviet journals, both in the original and translated, that is accessible to the West.

The first two chapters provide the basic Navier-Stokes hydrodynamic framework, accommodating readers with a background primarily in mathematics and physics. Here, in addition to discussing boundary layer exchange processes, Kibel′ also provides a scale-analysis justification of the hydrostatic approximation. The next chapter extends the scale argument to demonstrate the quasi-geostrophic, quasi-nondivergent and quasi-barotropic character of large-scale atmospheric motions, laying the ground work for the filtering approximations to be used in the remainder of the book. The following three chapters apply linear analytical techniques to the study of the properties of such motions and finally to the stability characteristics of baroclinic disturbances.

Chapter 7 begins the consideration of the general non-linear problem, with some emphasis on Green's function expansions. The next two chapters demonstrate the application of finite difference methods to the integration of barotropic and then to baroclinic models. Kibel′ then turns his attention to the smaller-scale frontal motions and considers the application of the balance ("quasi-solenoidal") approximation. The last two chapters touch on non-inertial influences: the introduction at the lower boundary of large-scale orographic barriers, boundary layer exchanges of momentum, heat and water vapor, the internal release of lateral heat, and radiative transfer.

The Conclusion, though short, speculates upon the use of the primitive equations of motion, and proposes the application of numerical hydrodynamical methods to the problems of the prediction of cloud and precipitation, cumulus convection, the sea-breeze, and small-scale orographic motions, all of which have become a reality since the writing of this book.

It is unfortunate that the references are not always documented beyond the author and year of publication. Also the reproductions of figures from the original are only marginally acceptable. Despite these deficiencies, no dynamic meteorology library can be considered complete without this volume.

JOSEPH SMAGORINSKY

U. S. Weather Bureau
Washington, D. C.

21[V, X].—R. W. CLAASSEN & C. J. THORNE, *Steady-State Motion of Cables in Fluids, Part 2, Tables of Cable Functions for Vertical Plane Motion*, PMR-TM-63-9, Pacific Missile Range, Point Mugu, California, 1963, 487 p., 21 cm.

In Part 1, tables [1] were given for calculating the shape and tension of a neutrally-buoyant flexible cable in a stream. The present volume, Part 2, extends the previous work to include the effect of a weight parameter.

These tables should be quite useful in the design of cable-towed systems. Their application is illustrated in the first part of the volume by a series of eleven examples. A less extensive set of tables for the same purpose is available in David Taylor Model Basin Report 687, by Leonard Pode, dated March 1951 [2], and in a supplement thereto [2].

LOUIS LANDWEBER

State University of Iowa
Iowa City, Iowa

1. CHARLES J. THORNE, GEORGE E. BLACKSHAW & RALPH W. CLAASSEN, *Steady-State Motion of Cables in Fluids, Part 1, Tables of Neutrally Buoyant Cable Functions*, NAVWEPs Report 7015, Part 1, NOTS TP 2378, China Lake, California, 1962. [For review, see *Math. Comp.*, v. 18, 1964, p. 337, RMT **55**.]
2. LEONARD PODE, *MTAC*, v. 11, 1957, p. 282–283, RMT **123**.

22[X].—*The Universal Encyclopedia of Mathematics* (with a foreword by JAMES R. NEWMAN), Simon and Schuster, New York, 1964, 715 p., 19 cm. Price $8.95.

This pretentiously entitled compendium of mathematical information is an English translation and adaptation of *Meyers Rechenduden*, published in 1960 by the Bibliographisches Institut in Mannheim.

The body of this encyclopedia is arranged in three main subdivisions: Alphabetical Encyclopedia under Subjects, Mathematical Formulae, and Mathematical Tables.

In the publisher's prefatory note we are informed that the range of mathematics covered is that "from beginning High School through College, but stopping short of a degree in mathematics." The book does not profess to be addressed to the professional mathematician, but rather to the interested layman and the technical student.

The Foreword further clarifies the extent of the subject matter by including a remark that many branches of mathematics from arithmetic through the calculus are included, but that higher branches such as group theory and algebraic topology are excluded.

This limitation in the material presented is reflected also in the numerous formulas presented, which are listed under the nine subheadings of Arithmetic, Algebra, Applications, Geometry and Trigonometry, Analytical Geometry, Special Functions, Series and Expansions in Series, Differential Calculus, and Integral Calculus.

A total of five mathematical tables, together with explanations of their use, comprise the last part of this book. Table 1 gives x^2 (exact), x^3 (3 D), x^{-1} (5 D), $x^{1/2}$ (4 D), $(10\,x)^{1/2}$ (3 D) and $x^{1/3}$ (4 D) for $x = 1(0.01)\,10$; Table 2 lists to 5D the mantissas of the common logarithms of all integers from 1000 through 10009; Table 3 gives $\sin x$, $\cos x$, $\tan x$ (each to 5 D) and $\cot x$ (6 S) for $x = 0(0.001)0.8$, as well as the sexagesimal equivalent of x to the nearest $0.01''$; Table 4 contains $\sinh x$, $\cosh x$, $\tanh x$ (each to 5 D), $\coth x$ (6 S), $\ln x$ (5 D), and $e^{\pm x}$ (5 D) for $x =$