Vorlesungen über Darstellende Geometrie. By Dr. Emil Müller. II. Band: *Die Zyklographie.* Edited from the manuscript by Dr. Josef Leopold Krames. Leipzig and Vienna, Franz Deuticke, 1929. ix+476 pp.

The third edition of the second volume of Dr. Müller's text and the first volume of his lectures were reviewed by the present reviewer in this Bulletin in 1923 (vol. 29, pp. 478–479). The first volume of the lectures was in the name of Dr. Müller and Dr. Erwin Kruppa.

Dr. Krames states in the introduction that the late Dr. Müller entrusted to him the editing of the manuscript for this second volume, only part of which was then in form for publication.

This book contains a more extensive use of the orientation of circles than had previously been made by Fiedler. In fact, the authors' fundamental operations are with orientated circles, (Zykeln), orientated straight lines (Speeren), and orientated curves (Richtungskurven). Their use of these terms is in harmony with that of Ed. Laguerre.

The ten chapters deal with the "zyklographic" representation of points, straight lines, planes, curves, and nets of curves, and surfaces and with contact transformations, etc. Special attention is directed to the chapter on "*C*-Geometrie" (parabolic pseudo geometry).

We are endebted to Dr. Krames for his skill in editing this unfinished manuscript—the last contribution of a talented and industrious worker in the field of descriptive geometry.

E. B. Cowley

Repertorium der Höheren Mathematik. By E. Pascal. Second edition: first volume, *Analysis*; second section. Edited by E. Salkowski. Leipzig, B. G. Teubner, 1927. Pp. v–xii and 529–1023.

Parts of the second edition of the Pascal Repertorium have been reviewed, upon their appearance, in this Bulletin, and the outstanding features of the work have been fully discussed. It is therefore unnecessary to make very detailed comments on the present section. Reference is made to the Bulletin: vol. 19, pp. 372–374, and vol. 29, p. 373.

Approximately two-thirds of this second section of the first volume is devoted to the theory of analytic functions in its classical ramifications, and a good exposition is given of both the Weierstrassian and Riemannian points of view. A relatively large portion of the space thus reserved for function theory is assigned to the automorphic functions and the elliptic modular functions. The remainder of the book offers a brief treatment of fundamental concepts and methods in (1) the theory of differential and difference equations, and that of differential forms, (2) the theory of continuous transformation groups, and of contact transformations, and (3) the calculus of variations. Contributors to the section are: A. Guldberg of Oslo, Ernesto Pascal of Naples, F. Engel of Giessen, Hans Hahn of Vienna, Gustav Doetsch of Stuttgart, E. Jahnke and A. Barneck of Berlin, H. W. E. Jung of Halle, and R. Fricke of Braunschweig.

In conformity with the general plan of the undertaking, the present section, like its predecessors in the second edition, attains a definitely higher degree of readability than one has hitherto been accustomed to expect in professedly encyclopedic summaries of mathematical science. Although proofs are, of necessity, frequently omitted, theorems are stated with clearness and accuracy, and in well-arranged sequence. References to the literature, while by no means exhaustive, will in most cases provide ample orientation for those who wish to undertake specialized studies.

By reason of the arrangement of the material and the style of exposition, it is probable that most mathematicians will find in this section of the Repertorium not only appreciable stimulation but also a measure of downright enjoyment.

L. S. HILL

Tables of Damped Vibrations. By W. E. Milne. University of Oregon Publication. Mathematics Series. Vol. 1, No. 1, March 1929. 39 pp.

In an earlier paper entitled *Damped vibrations. General theory together with solutions of important special cases*, dated August, 1923, the author gave fairly extensive tables covering the case in which the damping is proportional to the square of the velocity, and short tables applicable to the more general situation in which the resistance function is of the form $R=v(B\pm Dv)$, where v is the velocity and B and D are positive constants. The sign to be taken is the same as that of v.

The objects of the present paper are (a) to furnish more extensive tables for the solution of the problem of oscillations with a resistance function of the type cited and (b) to supply additional tables applicable to the case where the term involving v^2 does not change sign when the sense of the motion reverses. A concrete application of case (b) is afforded by the oscillation of water in the hydraulic surge chamber.

The fourteen tables,—all of four decimal places,—are preceded by useful preparatory paragraphs on the "Scope of Application, The Hydraulic Surge Chamber, Interpolation and Method of Computation." In the first of these attention is called to the fact that, in many cases, the binomial resistance function quoted above may represent experimental data as satisfactorily as the conventional relation $R=Cv^m$. In particular, when m lies between 1 and 2, (as is often the case in practice), it is shown that it is possible to determine B and D in such a manner as to make the error incurred by using the easily calculable binomial in place of the mth power monomial resistance formula of no greater importance than the other uncertainties inherent in the problem. For illustration, the "standard error" attains its greatest magnitude of about 0.0082 when 1.4 is the value of m. Since the tables furnish solutions of differential equations which cannot be solved in terms of known functions they will be welcomed by mathematicians, physicists, and engineers when problems of damped oscillations arise in their investigations and demand numerical solution. The computation of the tables was aided materially by a liberal grant of funds from the National Academy of Sciences.

H. S. UHLER