

independent variable; the absolute rate is obtained when t is taken as the independent variable; and finite values having the rates for their ratio are next assigned to dx and dy ; I quote here in part from the preface.

The following chapter headings with the number of pages given to each show the emphasis placed on the several subjects: Functions, derivatives, and differentials, 43; Successive derivatives, 15; Maxima and minima, 17; Evaluation of indeterminate forms, 18; Development of functions in series, 29; Application to plane curves, 52; Functions of two or more variables, 14. From this it will be plainly seen that the evaluation of indeterminate forms and the applications to plane curves certainly receive more attention than is warranted; especially in view of the fact that indeterminate forms to be evaluated by calculus methods arise but rarely in practice and are more or less "cooked up" to suit the occasion. It is doubtful, too, if an elementary calculus is the proper place for a detailed study of the derivation of the equations and properties of the exhaustive list of higher plane curves here studied, even though these have become household words among geometers.

In the abridgment space might well have been saved by omitting entirely the brief references to pedal curves and intrinsic equations. In its place it would be possible to treat more fully such a subject as the radius of curvature, which latter seems almost lost to view.

The problems, with answers, following the several sections are of a type suitable for an elementary text in that they do not seem to be of the kind where the principles of the calculus are lost sight of in the maze of reductions involved in arriving at the answers. If any criticism were to be made, it would surely be to the effect that the answers too often "come out easy" instead of "correct to so many decimal places," a point to be considered since actual problems in the application of the calculus naturally come out in decimals.

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Hyperbolic Functions. Smithsonian mathematical tables. By GEORGE F. BECKER and C. E. VAN ORSTRAND. Washington, Smithsonian Institution, 1909. 8vo. li + 321 pp. \$4.50.

THIS volume constitutes the fourth in the set of tables for scientific investigation published by the Smithsonian Institu-

tion, the others being meteorological, geographical, and physical. It is intended to be supplementary to the logarithmic tables in use by all computers. The contents are: Table I, five place values of $\log \sinh u$, $\log \cosh u$, $\log \tanh u$, $\log \coth u$; Table II, five place values of the four natural functions; Table III, five place values of $\sin u$, $\cos u$, $\log \sin u$, $\log \cos u$, the argument u being in radians; Table IV, $\log_{10} e^u$ to seven places; Table V, five place natural logarithms; Table VI, gudermannian of u to seven places in radians and corresponding degrees, minutes, and seconds; Table VII, anti-gudermannian to hundredths of a minute (meridional parts for a spherical globe); Table VIII, radians into degrees. The introduction contains definitions and formulas.

The book is clearly printed and easy of reference. Some of the tables are borrowed, but a large number of entries are new computations either for this collection or for checking old values. The tables cannot fail to be of great service in advancing the use of the hyperbolic functions.

JAMES BYRNIE SHAW.

Problèmes et Exercices de Mathématiques générales. By E. FABRY. Paris, Hermann et Fils, 1910. 8vo. 420 pp. 10 fr.

THE volume on General Mathematics preceding this was reviewed in the BULLETIN, volume 15 (1909), pages 395–399. The present book contains problems and their solutions, to accompany the text proper. The problems occupy 80 pages, the solutions 336. There are 235 problems in algebra, 231 in analytics, 173 in analysis, and 90 in mechanics. These are solved in full in the remaining pages. As a whole the problems would demand considerable ingenuity on the part of the student. For an average student, who knew only what is to be found in the *Traité*, there are many which would be beyond his range. They are not in this sense exercises. But as a collection of solved illustrations of the subjects treated in the *Traité*, the book is quite valuable. The student would undoubtedly acquire considerable skill in following these models. This is an excellent storehouse from which extra problems might be drawn for the ambitious students in our American classes.

JAMES BYRNIE SHAW.