the German "yes") is currently transliterated by any of the following letters and combinations according to the phonetic interpretation of the transliterator: ia, ya, j, ja or a. Possibilities for confusion are obvious. One need only reflect that a name beginning with this letter may be placed in four different positions in a Roman alphabet index. Although Russian orthography is highly phonetic (in contrast to the English), there are some cases of variability in the pronunciation of letters. This also results in various transliterations and consequent confusion in the index.

The Library of Congress employs a system which I do not like as a student of language but have adopted for practical purposes in my scientific studies. This system provides us with an equivalent for every Russian letter. As there are more letters in the Russian alphabet than in the current American alphabet, some diacritical signs and vowel and consonant combinations are used in conjunction with our own 26 letters. Although *approximate* phonetic rendering is obtained, the rules provide for use of the same equivalent *invariably* regardless of pronunciation. This is an essential regulation for maintaining so-to-speak "index integrity." Although one does sacrifice some phonetic value in strict adherence to the Library of Congress rules, it is the most nearly standard system, and in the interests of uniformity I urge its adoption by scientists dealing with Slavic literature. A diagrammatic résumé is on file in libraries and may also be obtained from Washington, D. C.

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IN SCIENCE for March 12 (p. 243) Dr. Hrdlička commented on the unfortunate lack of uniformity in transliterations of Russian names. He was justified in his criticism, which is supported by Dunlap in SCIENCE for April 30. The same name ending in "v" I have sometimes found transliterated in various publications four different ways, *i.e.*, "v", "w", "f" and "ff". Uniformity could be secured easily if the rules of the American Library Association were followed by at least all American writers. I have found a 3×5 inch library card published by the Library of Congress and carrying this system, most convenient in checking my memory of the transliterations.

The ligatured diphthongs used in this system involve a difficulty in publication, as these characters are not included in the equipment of any presses known to me, which use monotype machines. By omitting the arc which is used as a ligature, this trouble can be avoided. I have done this with a note stating the policy, and I know of at least two American presses which are following this practice.

R. M. STRONG

SCIENTIFIC BOOKS

MATHEMATICS

Basic Mathematics for Pilots and Flight Crews. By C. V. NEWSOM and HAROLD D. LARSEN, University of New Mexico. vi + 153 pp. New York: Prentice-Hall, Inc. 1943. $1.50.

THIS is a brief presentation of those parts of geometry, algebra and numerical trigonometry needed by members of the air force. The authors have kept in mind the recommendations of the Civil Aeronautics Administration, as well as the specific weaknesses in mathematics found by air force instructors. A review of arithmetic is included, and such topics as graphs, scales and measurement and vector diagrams are stressed. The principles of straight and circular slide rules are explained. There are a large number of practical problems, most of which will directly appeal to the student as related to aeronautics. The book seems well suited for use as a textbook for pre-flight preparation at the high-school level either in the classroom or through home study.

Analytic Geometry. By EDWARD S. SMITH, MEYER SALKOVER and HOWARD K. JUSTICE. University of Cincinnati. xii + 298 pp. New York: John Wiley and Sons, Inc. 1943. $2.50.

THIS text gives an extended treatment of plane analytic geometry, including chapters on higher plane curves, polar coordinates, parametric equations and empirical equations, followed by a brief treatment of solid analytic geometry. A short chapter on plane sections of a right circular cone, in which the fundamental properties usually taken as definitions are geometrically derived, precedes the discussion of the different types of conics. In this chapter, as well as in those on solid geometry, the figures are not only mathematically correct, but carefully designed to suggest the proper spatial relations. The authors have shown good mathematical judgment in avoiding incorrect statements, and sound pedagogical judgment in their selection of topics and omission of certain fine points. For some complicated proofs the student is referred to an outline in an exercise. The book covers competently the content of the conventional freshman course in analytic geometry, including ample material for the ablest students, and compares favorably with existing text-books in this field.

Differential Equations. By HARRY W. REDDICK, the Cooper Union School of Engineering. ix + 245 pp. New York: John Wiley and Sons, Inc. 1943. $2.50.

BESIDES most of the standard methods of solving ordinary differential equations, this text includes a chapter on power series solutions. Many of the worked problems and numerous exercises deal with physical and engineering applications, including full numerical data. The explanations are given in more detail than is often the case. The author's interest in technical applications leads him to discuss linear equations with constant coefficients immediately after equations of the first order, and to omit envelope problems and singular solutions. The book is suitable for the peacetime undergraduate course in differential equations, and just now may prove useful in some of the army training courses which devote a few weeks to differential equations and their technical applications.

Plane and Spherical Trigonometry with Four-place Tables. By WILLIAM C. BRENKE, University of Nebraska. x + 269 pp. New York: The Dryden Press. 1943. $1.90.

THIS revision of an earlier text-book includes all the traditional contents of courses in plane and spherical trigonometry with applications to surveying and navigation, as well as several additional topics. Thus there is a chapter on vectors and one on the mil and its use in artillery problems. A three-place table of functions of angles in mils is given. The four-place tables include a table of haversines, as well as those usually given. Computation by logarithms is explained in an appendix, but there is no reference to use of the slide rule. The treatment throughout is clear and comprehensive. The book should prove useful as a text in many of the courses now taken by civilians or service men.

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PHOTOGRAPHIC REPRODUCTION

Principles of Photographic Reproduction. By CARL W. MILLER. New York: The Macmillan Company. xii + 353 pp. 132 figs. 1942. $4.50.

"PROBABLY no one will read this book who has not spent many hours with photographic manipulation and who does not covet the opportunity to spend many more."

Thus, in the preface, does Dr. Miller warn that his book is not one for the beginner in photography. On the other hand, this does not mean that the book throughout is highly technical and abstruse—understandable only to those who have spent years in photographic research.

Among men of science, there are many to whom photography is a hobby as well as a useful tool. To them the general processes of exposure, development and printing, both by projection and contact, are entirely familiar, but perhaps some of the more advanced methods are mysteries. To such persons, who would naturally want a work thoroughly scientific in its treatment, Dr. Miller's book should be most welcome.

The arrangement of the book is a logical one. There are three main parts; the first on drawing, the second on gradations, the third on color. The part on "Drawing," concerned with the way in which the image of the scene or object is produced, starts with the lens itself. Then come chapters on the size, location and brightness of the image, on supplementary lenses, perspective, depth of focus and the arrangement of subject material. The latter is an excellent simple account of the basic principles of composition, a subject with which the scientist-photographer might be least familiar.

The camera obscura yielded images long before there was any photography. The image must be perpetuated, and that is the subject of part two—"Gradations." After chapters on exposure and development, the print is discussed. The limitations of chloride and bromide printing papers lead naturally to means for individual control and then to such processes of the expert as platinotype and palladiotype, carbon, oil, gum, carbro and bromoil. The final chapter of this section is concerned with the preparation of transparencies and lantern slides, with which beautiful naturalness can be secured.

The third and last part deals with color—first the problems of representing color in monochrome, then of reproducing color itself, both by additive and subtractive methods. In the chapter on subtractive color photography, "because of the greater economy of thought in visualizing color processes and the ease with which essential calculations can be carried through," the matrix algebra is introduced. Enough explanation is given to acquaint the reader possessed of some mathematical background with its use.

Methods of making three-color separation negatives and of printing them, multilayer films (*e.g.*, Kodachrome and Agfacolor) and the use of masking and other refinements in the precision reproduction of color occupy most of the concluding chapters.

In case the book is to be used as a text in a course in advanced photography, a number of problems are contained in the appendix. These will also be useful for the person using it in self-study, particularly as the answers are given. Four-place logarithms and anti-logarithms are included as well as a table of weights and measures, references to the literature