

Books

Math is Fun (Revised Edition). By Joseph Degrazia. 159 pp. Emerson Books, Inc., New York, 1954. \$2.75.

This little volume is a pleasant addition to the long list of mathematical "recreations" books beginning with the classic by W. W. Rouse Ball, extending down through Steinhaus' remarkable "Mathematical Snapshots" and the intriguing volume by Kraitchik. It goes almost without saying that many perennial problems and puzzles have found their way into more than one of these books, yet the appearance of a new collection will always be welcomed by devotees of this pastime on the chance that something new will be found to challenge their ingenuity.

Mr. Degrazia points out the fact that "the staples of scientific entertainment are certain historic problems which have perplexed and diverted men for centuries." He adds, however, that the majority of the items in the book are new, many having been devised by the author himself. It is stated that nothing beyond a knowledge of simple high-school mathematics is needed to solve most of the puzzles, and that many call for only ordinary arithmetic.

Mention of some of the chapter headings may serve to give a general indication of what is included in the collection: Cryptograms get a chapter; How Old are Mary and Ann? (remember this kind?) merit another one. Wolf, Goat and Cabbage deals with river-crossing problems. The author tells us that the teacher of Charlemagne devised this type of brain-teaser for his imperial pupil, and that a seventeenth-century Italian mathematician worked out a more sophisticated version involving three jealous husbands and their wives. There are chapters dealing with Clock Puzzles, Speed Puzzles, Railroad Shunting Problems, etc. The author acknowledges the omission of magic squares and of geometrical problems, but promises to deal with the latter in a subsequent publication.

In an Appendix, solutions to the problems are given "where needed". A sample, selected from the chapter entitled On the Borderline of Mathematics, reads: "If Bill and Cal were wearing red hats, Abe would have known that his hat was blue, because there were only two red hats. Since Abe didn't know the right answer, Cal concluded that there remained only two possibilities for himself and Bill. Either both had blue hats or one had a blue, the other a red hat. If he himself had a red hat, Cal reasoned, Bill would have concluded that he, Bill, had a blue hat, because otherwise Abe would have known that he, Abe, must have a blue hat. So Bill, be-

cause he was not able to tell correctly the color of his own hat, involuntarily betrayed to Cal that his hat was not red. Therefore, Cal could tell that his hat was blue."

If you enjoy this sort of thing, *Math is Fun* is your meat.

Ira M. Freeman
Rutgers University

Handbook of Probability and Statistics with Tables. By Richard Stevens Burington and Donald Curtis May, Jr. 332 pp. Handbook Publishers, Inc., Sandusky, Ohio, 1953. \$4.50.

With one reservation, I recommend this book to physics libraries and to any physicist who ever computes deviations from a mean. The reservation relates to least squares; elsewhere, I think the authors have done very well a job that needed doing.

There are plenty of books on statistics; the trouble is, they try to make their readers into statisticians. We physicists would use statistical methods more if we could find out *quickly* what the methods are. Here is a book that will help. It covers the essential concepts and techniques tersely but intelligibly; it wastes no space on proofs or on tedious algebraic details, but it discusses the definitions and formulas fully enough to give some understanding of their implications and applications.

The eighteen chapters of the text cover the basic concepts of statistics and probability theory, the important distributions, the techniques of statistical inference from samples, the analysis of variance, and several other topics. The twenty-three tables include the standard statistical tables and tables of elementary functions that are useful in statistical calculations. There are many diagrams and illustrative examples; indentation and bold-faced type are used effectively.

My objections to the authors' treatment of least squares are the following. What they present is a purely formal procedure. They do not relate this procedure to maximum-likelihood estimation, which they discuss elsewhere in the book, or to the theory of best linear estimates, which they omit altogether. They imply that determinants provide a practical method of solving the normal equations, and they ignore orthogonal polynomials. A physicist who relies on this book for an up-to-date account of least-squares theory is likely to do what several physicists have done: laboriously rediscover a well-known theorem of Gauss, Chebyshev, Markov, Fisher, or Neyman and publish it as original research. What needs to be said would fit into the blank space on page 133; I hope it will be there in the next edition.

Here are two suggestions for minor improvements. (1) Analysis-of-variance enthusiasts may think the treatment of experimental designs inadequate; I believe that in most respects it is a sufficient introduction to a highly technical subject, but the skeptical reader will suspect that Latin squares are impossible, for not one is written down. Why not include several? There is room on page 211. (2) There is a good concise bibli-