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Winning ways for your mathematical plays, by Elwyn R. Berlekamp, John H. Conway, and Richard K. Guy, Academic Press, London, 1982, vol. 1, *Games in general*, vol. 2, *Games in particular*, xxxii + 861 pp., \$22.50 P/B, \$64.50 H/B.

Winning ways is a masterpiece. We should have been disappointed were it anything less. Fifteen years in the preparation, and representing the collaboration of three mathematicians of extraordinary talent, the result is the most compelling and comprehensive treatment of mathematical games to appear in this century.

First, an enumeration of some of the things which this book is *not*. It has an empty intersection with “the Theory of Games” in the sense of von Neumann and Morgenstern [6]. More generally, it avoids discussion of “games” in which randomizing elements (the roll of dice, the shuffling of cards, the spinning of discs, or other methods of selecting a “move” in a stochastic fashion) play any role. This leaves full information, “deterministic” games such as chess, checkers (draughts), and Go, in which two players move alternately. However, these three examples of games actually played by adult humans are far too complicated to be analyzed in *Winning ways*.

Winning ways is published in two volumes. The first volume (WWI) is subtitled *Games in general*, while the second (WWII) is subtitled *Games in particular*. Each volume in turn consists of two parts. The four parts are associated successively with Spades, Hearts, Clubs, and Diamonds, but this has no underlying significance, and is for identification purposes only.

“Spade-work” (the first eight chapters) develops the generalized theory for analyzing and evaluating Nim-like games. The published analysis of Nim itself [1] goes back to C. L. Bouton in 1902. In 1939, P. M. Grundy [5] published a method for the recursive evaluation of positions in a relatively large class of Nim-like games, and this evaluation function for such a game became known