R. Nowakowski

Richard K. Guy is chiefly responsible for the existence of Combinatorial Game Theory. Although he was not as prolific in game theory as in his other fields, he was a promoter behind the scenes and a mentor to many people.

Extending the Impartial Theory. Through his interest in chess, in 1947, Richard met T. R. Dawson who showed him a chess puzzle with pawns, now known as Dawson's Chess. Dawson proposed it as a misère problem (last player to move loses). Richard mis-remembered and solved the last-player-to-move-wins game. (This is a well-traveled path for starting a research career. As a 3rd year undergraduate, I misunderstood one of Richard's number theory homework problems. Richard turned my solution into my first research paper.) At that time, Richard didn't know about the work of Grundy or Sprague on impartial games. Independently, he went on to develop the theory. He was advised to contact C. A. B. Smith. Smith knew about the Sprague-Grundy theory and realized that Richard had shown that the theory was not just a curiosity but applied generally. Moreover, Richard had discovered octal games: essentially, the rules define what a player can remove from a heap and when the remainder can be split into two heaps. This class generated many intriguing conjectures and created combinatorial game theory as a research topic. Indeed, the most important conjecture—the sequence of values for every finite octal game is periodic—is still unsolved today. Richard was still pushing the boundaries of game theory at 90 [Fink and Guy 07].

Richard at work at Amiskwi Lodge near Golden, British Columbia, 1998

Assembling the Cast and Winning Ways. John H. Conway knew Richard's son Michael, who was also at Cambridge. Michael passed on to John all he knew about games. John was keen to learn more and a lifetime friendship and collaboration started. John asked about partizan games but it was many years before anyone had an answer. Elwyn Berlekamp had used the Guy-Smith paper [Guy and Smith 56] to further the analysis of Dots-and-Boxes. In 1967, Elwyn suggested that they write a book about games and Richard suggested John Conway be included. Winning Ways [Berlekamp et al 82] was finally published in 1982. This book is still as inspirational today as it was then and a must-read for any 'serious' student of combinatorial games. It contains many nuggets of wisdom, insights that have not been fully explored, and questions that direct research today. Of course, the book is not 'serious'. It contains much of Richard's (and John's) word play. Richard firmly believed that the right terminology and phraseology were important for motivation and to help people remember and understand concepts.

Promotion. After the publication of Winning Ways, Richard was involved in expounding the theory. In addition to innumerable talks, he organized and edited the Lecture Notes of the 1990 AMS Short Course on Combinatorial Games [Guy 92]. He helped organize the first MSRI and BIRS conferences on the subject. These led to the book series Games of No Chance which continues today. Richard wrote two of the first expository articles in the first book [Guy 96a, Guy 96b] and they are still well-worth reading. He also collated problems and wrote the first four Unsolved Problems in Combinatorial Game Theory articles for the series [Guy 96c]. A little known and hard-to-get gem is Richard's book Fair Game [Guy 89] which is an excellent introduction to impartial games.

Final Note. Richard K. Guy was great to be around. He was enthusiastic, always willing to roll up his sleeves and get stuck in. I owe my outlook on how and why to do mathematics, and the enjoyment I have obtained from my career, to him.

Richard Nowakowski, *Professor Emeritus in the Department of Mathematics and Statistics at Dalhousie University and a foremost expert on combinatorial game theory, obtained his PhD from the University of Calgary in 1978 under Richard Guy's supervision.*

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