

# INTRODUCTION TO SOLOMON W. GOLOMB

E. Berlekamp

*University of California, Los Angeles*

berlek@math.berkeley.edu

I feel greatly honored to write this Foreword to the Proceedings of the Golomb70-fest. Prof. Golomb is well known as the recipient of the highest honors possible at University of Southern California, the Information Theory Society, and the US engineering profession.

Solomon W. Golomb was born on May 30, 1932. His father was a rabbi and a linguist. Sol soon developed a precocious appetite for mathematics as well as for languages and a wide range of classical literary works. Sol completed his undergraduate studies at Johns Hopkins in two years, then obtained a PhD in mathematics from Harvard, and went to Norway on a Fulbright fellowship, where he met his future bride. Along the way, he spent a summer working for Martin Aircraft Company, where he also became interested in a variety of engineering problems in aerospace electronics. In pursuit of this interest, he moved to Southern California to begin his first full-time job with the Jet Propulsion Laboratory. This was in the early heyday of NASA, immediately following sputnik. Sol soon emerged as the leader of JPL's Space Communications efforts.

My first encounter with Golomb's name was as the author of a paper published in the proceedings of a 1962 symposium, entitled, "Mathematical Theory of Discrete Classification." I thought this was a brilliant paper, and it had a big impact on me. I was surprised and flattered when I was invited to meet Sol at JPL in January 1965, and only thereafter did I come to realize the wide breadth of his work, which included many other papers and books that were generally regarded as even more significant than the one that had so strongly impressed me. By January 1965, Sol had already moved from JPL to his professorship in both mathematics and electrical engineering at the University of Southern California, but he remained an influential eminence grise at JPL. Largely on his recommendation, JPL hired me as a consultant. I visited there weekly for the next year and a half, and I was able to work personally with an

extraordinary cast of characters, many of whose names appear in this volume. The two who worked most closely with me, Gus Solomon and Ed Posner, are now both deceased. There was also a bright array of luminary consultants, including Lloyd Welch, Andy Viterbi, Irwin Jacobs, Marshall Hall, and some Caltech students, including Bob McEliece and Richard Stanley. Sol was heavily involved in the recruitment of most of these people, as well as many others. On the occasion of Sol's 60th birthdayfest in 1992, Gus Solomon proposed a memorable toast to "the man who brought modern combinatorial mathematics to Southern California." At the time, I was shocked by the boldness of the claim. After some further reflection, I was also shocked by the surprisingly large amount of truth it contained.

Sol has written landmark books on a wide variety of topics. "Shift Register Sequences" are used in radar, space communications, cryptography and now cell phone communications. This book has long been a standard reading requirement for new recruits in many organizations, including the National Security Agency and a variety of companies that design anti-jam military communication systems. "Polyominoes" defined that subject and established Sol as a leader in the broad field of recreational mathematics. Both "shift register sequences" and "polyominoes" have become subject headings in the classification of mathematics used by Mathematical Reviews. "Digital Communications with Space Applications," written with Baumert, Easterling, Stiffler, and Viterbi, was among the earliest and most influential books on that subject. "Information Theory and Coding," written with Peile and Scholtz, is a novel text for graduate course which has become very popular at USC and elsewhere.

Sol maintains a strong interest in elementary number theory. Many of his research papers deal with questions concerning prime numbers. Sol also has a great interest in teaching, both advanced and elementary courses, and in promoting popular interest in mathematics. He is an avid collector, solver, and composer of problems. He has authored the Problems Section (sometimes known as Golomb's corner) in periodicals including the Newsletter of the IEEE Information Theory Society, the Alumni Magazine of Johns Hopkins University, and the Los Angeles Times. Following a change of publishers some years ago, Sol's column was discontinued. But, he noted, this was totally consistent with the new editorial policy then being adopted, which also discontinued the entire Science News section and increased the coverage of astrology.

Sol's publications also include some provocative commentaries on the philosophy and history of mathematics. His 1998 critique of G. H. Hardy's famous 1940 "Mathematician's Apology" ("Mathematics Forty

Years After Sputnik”) is a well-documented and articulate exposition of the practical values of ”pure” mathematics, including even those topics discovered by purists like Hardy. In some respects, Sol’s 1982 obituary of Max Delbruck may be a more objective view of the rise of modern molecular biology than could have been written by any of the major pioneers in that field. Golomb’s interest in biology predates even his own paper, ”On the plausibility of the RNA code,” published in the 1962 issue of *Nature*, long before the idea of a lengthy digital basis of inheritance had appeared on the mental radar screens of most biologists.

Sol has also been a senior academic statesman. He served as President of USC’s Faculty Senate in 1976-1977, as Vice Provost for Research in 1986-1989, and as Director of Technology at USC’s Annenberg Center for Communications in 1995-1998. He founded the ”National Academies Group” at USC, and restored the influence of the faculty on the governance of that university on certain occasions when the administrations of the day had been veering off course.

I have personally had the great fortune to be placed in positions which allowed me to see certain other aspects of Sol’s multi-faceted intellect. Annoyed by the commercial misappropriation of one of his polyomino games, in the late 1960s, Sol incorporated one of his hobbies into a company called ”Recreational Technology, Inc.” I accepted his invitation to become a founding director of this venture. Although this venture never had any outside investors, nor any significant sales or earnings, it became the dry run for another venture called Cyclotomics, which, at Sol’s urging, I founded in December 1973. Sol was my founding outside director and primary business mentor and confidante for the next 15 years.

## References

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