IN MEMORIAM
ROBERT C. THOMPSON
1931–1995

The matrix theory community was shocked and deeply saddened by the untimely death of Bob Thompson on December 10, 1995. He was awaiting a heart transplant that had recently become necessary.

After growing up near Vancouver, British Columbia and receiving his bachelor's and master's degrees from the University of British Columbia (UBC), Bob received his Ph.D. from Caltech in 1960. He was Olga Taussky Todd's first official student. After returning to the faculty at UBC for three years, Bob moved to the University of California at Santa Barbara (UCSB), where he spent the remainder of his career. At Santa Barbara, he began a long-term professional relationship with Marvin Marcus that included collaborative research, the founding of the journal *Linear and Multilinear Algebra* (now one of the three main journals of matrix theory), and the founding of the Institute for the Interdisciplinary Application of Algebra and Combinatorics. With the arrival of other prominent colleagues, including Ky Fan, Eugene Johnsen, Henryk Minc, and, later, Morris Newman, Santa Barbara became for several years the world's mecca for research in matrix theory. During this period, Santa Barbara did much to focus attention upon the subject of matrix theory and to promote the high-level research that has been the foundation of the subject's vigorous, world-wide renaissance. Important meetings and other special activities were hosted, and UCSB was a place for sabbaticals and other visits; assistance and inspiration were given to young researchers (such as this author), and many of the Ph.D. students trained at UCSB (Bob himself had 11) have become important contributors to the field. Several newer, strong centers of matrix research in other countries, such as Israel, Hong Kong, Portugal, and Spain, can trace their intellectual roots to Santa Barbara.

Bob published more than 120 papers and a number of other items (including four undergraduate textbooks) during his career. He was serving as an editor of this journal at the time of his death. His interests were very broad and, like many researchers, his work went through stages and changes in taste, so much so that it is impossible to briefly categorize in any accurate way. Bob read a great deal of matrix theory and actually listened carefully to virtually all talks at the meetings he attended, so he knew the subject very broadly. He was often able to make helpful suggestions, even about topics on which he had no interest in working. His early work was especially algebraic, often dealing with his thesis area (a favorite of Taussky Todd's), which was multiplicative matrix commutators (and their products) over arbitrary fields. This very detailed work answered nearly all major questions in the subject and showed a hallmark of Bob's work: a willingness and ability to make unusually elaborate algebraic calculations in order to answer a question. It was not that he didn't appreciate external or efficient, implicit tools if they were available. Quite the contrary—Bob was a major proponent of employing other parts of mathematics useful in matrix theory. But he almost always discovered or convinced himself of important ideas through very complicated calculations.

A unifying theme of the broad middle part of Bob's publishing career was the drive to discover and understand the exact relationship among particular fundamental matrix parameters. If necessary conditions were obvious or known, a proof of sufficiency often involved very intricate constructions. For example, Bob's work on invariant factors, including the Sá–Thompson inequalities (separate papers), became very well known and attracted attention to his work in the systems and control community. This period included a major influence from and collaboration with Morris Newman, often involving number theoretic issues in integral matrices. Other examples included

the relationship between diagonal entries and singular values, the diagonal entries of normal matrices, and a major effort—motivated by Lidskii's claims—to prove A. Horn's conjectures about the eigenvalues of a sum of two Hermitian matrices. It was most intriguing to Bob when an unusual condition turned up, such as the possibility of a subtracted smallest term in what otherwise appeared to be a majorization relationship. He wrote multiple numbered series of papers in this period, and there is still a wealth of not-well-enough-known information to be found in his nine-paper series on "principal submatrices." Readers can get to know Bob by reading his amusing and thought-provoking *American Mathematical Monthly* piece (*Amer. Math. Monthly*, Vol. 90, pp. 661–668) "Author vs. Referee...." It contains professional, as well as mathematical, insights and is a good example of some of Bob's interests, described above.

Most recently, Bob returned to one of his favorite areas: generalizations of the field of values/numerical range. Inspired in part by the many questions raised by a 1950 paper of Kippenhahn, he was working very hard on the quaternionic field of values. Bob rarely spoke about the same piece of work twice, but his fascination with the quaternionic field was evidenced by the fact that he spoke about this subject frequently in the last several major talks that he gave. Among the many services Bob did to research was to help dispel the misinformed view that linear algebra is simple and uninteresting. He often worked on difficult problems and, as much as anyone, showed that core matrix theory is laden with deeply challenging and intellectually compelling problems that are fundamentally connected to many parts of mathematics, perhaps more so than other subfields of mathematics. The body of Bob's work was honored with his 1988 Johns Hopkins Summer Lecture Series and his recent (unfortunately posthumous) ILAS Hans Schneider Prize in Linear Algebra.

Bob will surely be missed as an innovative researcher and expert resource, but his grace and style in the community will be missed just as much. He was always encouraging to others and never jealous; he simply worked hard to solve difficult problems—not just to publish—and he was always happy to acknowledge the role of others. His talks were fresh and informative and, though quiet, Bob always maintained a good sense of humor in matters both casual and professional.

Bob embodied a tradition of cooperation, respect, and the desire to advance knowledge in all aspects of matrix theory. In Bob's memory, let's hope that tradition will continue to prevail.

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