# A PERSONAL RETROSPECTIVE ON THE TENTH ANNIVERSARY OF THE DEATH OF EVELYN M. NELSON

1943 – 1987

Evelyn Merle Nelson, noted for her work in universal algebra, was born Evelyn Roden, of Russian-Jewish immigrant parents, in 1943 in Canada's steel-mill city of Hamilton, Ontario. She died on August 1, 1987 from complications following successful surgery for the cancer that she had managed for many years to keep hidden from friends and colleagues alike.

Evelyn attended Westdale High School in Hamilton and upon graduation at the age of thirteen entered the prestigious Mathematics–Physics–Chemistry Programme at the University of Toronto. In 1963 she transferred to the Honours Mathematics program at McMaster University in Hamilton, and soon married classmate Mort Nelson. She earned her B.Sc. in 1965, and was permitted while still an undergraduate to take graduate-level courses. Her graduate studies were completed in the mathematics department at McMaster. She earned her M.Sc. in 1966, writing a thesis under the supervision of algebraist Günter Bruns. The thesis, written in eight months, was published in 1967 in the *Canadian Journal of Mathematics* as "Finiteness of Semigroup Operators in Universal Algebra". Evelyn's first daughter was born shortly thereafter. Just a few months before Evelyn earned her Ph.D. in early 1970, her second daughter was born.

The mathematics department at McMaster had no immediate vacancies on its faculty, so Evelyn spent the next three years at McMaster teaching and carrying out research as a postdoctoral fellow and research associate. She was finally appointed Associate Professor in 1978 and promoted to full Professor in 1983. She was the chairperson of the department's Computer Science Unit from 1982 to 1984 and was then offered its chairmanship when it finally became an independent department, but she declined the offer, already suffering from poor health. She also served on the editorial board of the journal *Algebra Universalis*, which included a stint as the journal's editor, and she was an active participant in the Faculty Algebra Seminar that met once a week in the evenings. I also recall hearing many mildly complaining reports that more than once Evelyn brought her two

young daughters into the classroom where they would play near the front of the room or, when somewhat older, would quietly sit in on her classes.

I remember that when I first met Evelyn in 1982 shortly after I joined the Bertrand Russell Editorial Project, she mentioned to me her interest in set theory, telling me in particular that she was studying large cardinals, but not, specifically, sets bigger than measurable cardinals. Rather, she was interested at that time in studying the properties of algebraic structures that are built up from infinite sets.

As a research mathematician Evelyn produced over forty papers over the course of twenty years in various areas of algebra, especially universal algebra and algebraic logic. Many of these papers were written jointly with Bernard Banaschewski or Stanley Burris or Bjarni Jónsson. Universal algebra is concerned with classifying algebras according to their characteristics. One important way to calssify algebraic structures is by the complexity of the structure which they have. One of the very simplest of algebraic structures is the groupoid, which is a set with a single binary operation. Next in complexity is the semigroup, which is a groupoid to which the associative law applies. A monoid is a groupoid which satisifes the conditions for being a semigroup and in addition has a nullary operation (for example, zero) such that for any member $x$ belonging to the set comprising a groupoid, $x * 0 = x = 0 * x$. A "generating set" or "generator" of a semigroup is the smallest subset of the set comprising the groupoid from which the groupoid can be built up.

In her Master's Thesis, Evelyn proved that the semigroup with certain generating sets is finite. Much of her research was directed towards exploring the differences between algebraic structures that are finite and those that are infinite. Another way to classify algebraic strcutures is by the characteristics they share apart from their degree of structure. Algebraic structures which share certain characteristics are classified together as equational classes. Evelyn also investigated the properties of the various equational classes, with special emphasis on lattices, which are defined by the order relations which hold among the sets comprising the lattices. She approached the study of equational classes from the point of view of model theory, the part of mathematical logic most closely related to universal algebra.

**Selected Writings of Evelyn Nelson:**

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1975. *On the adjointness between operations and relations and its impact on atomic compactness*, Colloq. Math. **33**, 33–40.

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1977. *Classes defined by implications*, Alg. Univ. **7**, 405–407.

1977. (with B. Banaschewski). *Elementary properties of limit reduced powers with applications to Boolean powers, Contributions to universal algebra.* Proceedings of the Colloquium held in Szeged, 1975. Colloquia Mathematica Societas János Bolyai, vol. 17 (Amsterdam, North-Holland Publishing Co.), 21–25.

1977. (with B. Banaschewski). *Boolean powers as algebras of continuous functions.*

1978. *Filtered products of congruences*, Alg. Univ. **8**, 266–268.