

Giants of Science

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Helena Rasiowa

RASIOWA, Helena (June 20, 1917, Vienna - September 8 1994, Warsaw), mathematician. Daughter of a senior railway official, Józef Gozdawa Bączalski, and the mother of the Kudelski family.

She graduated from the Gymnasium of A. Warecka in Warsaw, took up musical studies in the piano class at the F. Chopin Higher School of Music in Warsaw, and in 1938 also commenced mathematics studies at the University of Warsaw. In 1936 she married and changed her name to Raś. She attended the lectures of J. Łukasiewicz, K. Kuratowski, K. Borsuk and W. Sierpiński. The outbreak of World War II interrupted her studies. She spent the first year of the war with her family in Lviv, then the whole family returned to Warsaw. In 1942, she established scientific contact with S. Mazurkiewicz and Cz. Białobrzęski, with whom she took exams at the underground university. At the same time under the supervision of J. Łukasiewicz and B. Sobociński she prepared her master's thesis in mathematical logic. The manuscript of the paper was destroyed by fire during the Warsaw Uprising, but R. recreated it and in 1946 obtained her master's degree. From November 1, 1945 to June 1992, she worked at the University of Warsaw, obtaining subsequent degrees and titles: senior assistant in the Department of Philosophy of Mathematics, assistant professor (1950–52), and deputy professor (1952–54). In 1950, she was awarded her PhD at the University of Warsaw on the basis of the dissertation: *Algebraic Treatment of the Functional Calculi of Heyting and Lewis*; A. Mostowski was her mentor. In 1954 she became an associate professor — in this position she worked in 1954–56 at the Department of Algebra at the University of Warsaw and at the Mathematical Institute of the Polish Academy of Sciences, where in 1956 she got her PhD (corresponding to the habilitation) on the basis of the dissertation entitled *Algebraic Models of Elementary Theories*

and Their Applications (published as two papers). She became associate professor in 1957 and full professor in 1967. From 1967, she worked only at the University of Warsaw and headed the Department of Foundations of Mathematics (1964–70), and after established the Institute of Mathematics - Department of Mathematical Logic (1970–92). She was also the dean (1958–60, 1962–66, 1968–77). In 1961–68 she was the scientific secretary of the Committee of Mathematical Sciences of the Polish Academy of Sciences, and from 1972 a member of its Presidium. In the years 1972–83 she chaired the Scientific Council of the Computing Centre (from 1977 - Institute of Fundamentals of Computer Science of the Polish Academy of Sciences). She was a member of the Central Qualification Committee (1976–79) and the Main Council of Science, Higher Education and Technology (1973–76, 1977–82).

R. was repeatedly invited to give lectures at renowned universities in Europe and both North and South America. She often chaired scientific sessions at international congresses and conferences. She was a member of the Association for Symbolic Logic (council member 1958–60) and the Executive Committee for European Affairs (1972–74). In 1972 she was an assessor in the Division of Logic, Methodology and Philosophy of Science of the International Union of History and Philosophy of Science. In the Polish Mathematics Association she was a secretary (1955–56), vice-president (1958), the associate editor of 'International Journal of Approximate Reasoning' (since 1986), and the collecting editor of 'Studia Logica' (since 1975). In 1992, she contributed to the establishment of the Polish Society of Logic and Philosophy of Science, being its president, and was also a co-founder and editor-in-chief of *Fundamenta Informaticae*.

R. is the author of over 100 scientific papers concerning mainly mathematical logic and its applications in the foundations of mathematics. In particular, she dealt with the issue of lattice theory, the application of algebraic and topological methods to the methodologies of formalised first-order theories, the extension of algebraic models to certain non-classical logics (e.g., constructive with strong negation) and multi-valued Post logics. Papers on the mathematical

foundations of computer science included logical systems equipped with expressions interpreted as programs and formulas describing the properties of programs. In the mainstream of algebraic methods in the study of intuitive logic and modal logics, created together with R. Sikorski, first algebraic proof of Gödel's theorem on the completeness of the classical predicate calculus is commonly known; this initiated the algebraic proofs of many theorems concerning classical and non-classical logics. In the monograph entitled *The Mathematics and Metamathematics* (with R. Sikorski, 1963) the authors concluded a general theory of logics algebraization. The algebraic methods developed by them allowed the obtaining of many other important theorems and are widely used today. In the monograph entitled *Algebraic Approach to Non-Classical Logics* ('North Holland', 1974) R. distinguished the broadest possible class of logics for which it is possible to formulate a general algebraic theory that allows for proving theorems for the whole class simultaneously. This monograph also contains algebraic theories of a broad class of non-classical logics. At the end of her life, she worked on another monograph *Algebraic Analysis of Non-Classical First Order Logics*; having prepared eight chapters of it, the work was left unfinished.

R. made a great contribution to the development of research on the application of mathematical logic in computer science. She realised that many problems in computer science can be solved with the methods of mathematical logic, and at the same time that problems that arise in computer science can be important for logic itself. She conducted, among others, important research on program logics, incomplete information reasoning methods and logical calculations for artificial intelligence systems. She is the author of a well-known academic textbook entitled *Introduction to Modern Mathematics* (1968), translated into many languages. R. was a continuator of the tradition of the famous Polish school of logic of the interwar period.

She has received many awards and distinctions, including the award of the Polish Mathematics Association, a team award of the 1st degree, an individual award of the 2nd degree, the medal of W. Sierpiński, and the title of honorary member of

the Polish Mathematics Association, as well as the Knight's Cross and the Officer's Cross of the Order of Polonia Restituta.

She was a kind and cheerful person. She skilfully and discreetly transformed her sensitivity to human problems into helping others. She was a tertiary of the Franciscan Order.

SBMP (Z. Pawlikowska-Brożek); Duda.

W. Bartol, E. Orłowska, A. Skowron: *Helena Rasiowa 1917-1994*, 'Bulletin of the European Association for Theoretical Computer Science' 1997, No. 62; E. Orłowska, A. Skowron: *Helena Rasiowa (1917-1994)*, 'Wiadomości Matematyczne' 1995, vol. XXXI.

Stanisław Domoradzki

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