

THE 70th ANNIVERSARY OF V.D.BELOUSOV

Galina Belyavskaya

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*Institute of Mathematics, Academy of Sciences of Moldova,
Kishinev, Academiei str. 5,
277028, Moldova*

On the 20th of February 1995 we celebrated the 70th birthday of the great Moldavian mathematician Valentin Danilovich Belousov, the famous specialist in the field of quasigroup theory, algebraic nets and functional equations. He was not only the creator of the quasigroup school in Moldova but also the excellent teacher.

V.D.Belousov was born in Bel'tsy, Moldavia. After studies in mathematics at Kishinev pedagogical Institute (1944-1947) he spent a short time as a school teacher and then taught at Bel'tsy pedagogical Institute. In 1954-1956 V.D.Belousov was a graduate student of Moscow State University, where the famous Russian algebraist professor A.G.Kurosh was his chief. Here he defended his candidate thesis (1958). In 1960-1961 V.D.Belousov was at Wisconsin University (USA), where he worked with the famous American scientist in the area of quasigroup theory professor R.H.Bruck. Beginning with 1962 up to 1988 he was Chair of the algebra and mathematical logic department in Institute of Mathematics of Moldavian Academy of Sciences and head of the algebra and geometry chair of Kishinev

State University (1967-1977). In 1966 he defended the doctoral thesis "Systems of quasigroups with generalised identities" and in 1968 was elected Corresponding Member of the Academy of Pedagogical Sciences of USSR.

V.D.Belousov was the pioneer in the area of quasigroup and loop theory in USSR and carried the great contribution at the development of this theory. He studied many questions of general quasigroup theory, such as the groups associated with quasigroups (multiplication groups of quasigroups) derivative operations of loops, regular mapping groups and nuclei of quasigroups, autotopies and antiautotopies of quasigroups, groups of inner substitutions with respect to an element, normal subquasigroups, isotopy and crossed isotopy of quasigroups and others. V.D.Belousov also investigated different classes of quasigroups and loops, particularly *IP*-quasigroups, *F*-quasigroups, *TS*-quasigroups, *CI*-quasigroups, Stein's quasigroups, *I*-quasigroups and *I*-loops, Bol loops. Especially deep results he received relative to the distributive quasigroups. His theorem that each distributive quasigroup is isotopic to a commutative Moufang loop is well known. V.D.Belousov also studied left-distributive quasigroups and loops isotopic to them. Many results are described in his monograph "Foundations of quasigroup and loop theory" (Russian, Moscow, "Nauka", 1967).

In the important paper "*Balanced identities in quasigroups*" (Russian, Matem. sbornik, v. **70(112)**, №1, 1966, p. 55-97) V.D.Belousov found the elegant characterisation of the quasigroups with balanced identities, having established their connections with linear (over groups) quasigroups. By his great paper "*Systems of quasigroups with generalised identities*" (Russian, Uspehi mat. nauk. v. **XX**, №1 (121), 1965, p.75-146) V.D.Belousov created a new branch of quasigroup

theory, having shown that the considered systems are connected with the solutions of corresponding functional equations on quasigroups. In this work he studied the systems of quasigroups with generalized identities of associativity (mediality, distributivity, transitivity) and with the generalised Stein's identity (\mathcal{S} -systems).

A large cycle of Belousov's work is devoted to the solving of different functional equations on quasigroups, such as the functional equations of general associativity, distributivity, mediality, the functional Moufang equation. In solving of the functional equation of general associativity Belousov's theorem about four quasigroups connected by the associative law plays the fundamental role. This theorem states that all of these four quasigroups are isotopic to the same group. The thorough study of the functional equations of general associativity for n -ary case led V.D.Belousov to the new concept of a positional algebra of quasigroups. The elements of such an algebra are quasigroups given on the same set, their operations are superpositions, each identity is a functional equation.

Belousov published a number of works devoted to the study of n -ary quasigroups. These works laid the foundation of n -ary quasigroup theory. Many of his results in these directions are reflected in his monograph " *n -Ary quasigroups*" (Russian, Kishinev, "Stiintsa", 1972). This book contains an information about general concepts for n -ary case, different classes of n -ary quasigroups (n -groups, medial quasigroups, \mathcal{TS} -quasigroups, Menger's quasigroups, IP -quasigroups, (i,j) -associative quasigroups), positional algebras of quasigroups, reducibility of quasigroups and different cases of the functional equation of general associativity.

The monographs "*Algebraic nets and quasigroups*" (Russian, Kishinev, "Stiintsa", 1971) and "*Configurations in algebraic nets*"

(Russian, Kishinev, "Stiintsa", 1979) by V.D.Belousov reflect his great contribution in the theory of algebraic nets (or webs as they are sometimes called) and open up a new area linking algebra, geometry and combinatorics.

Further on, by mean of original algebraic methods V.D.Belousov studied some combinatorial questions of quasigroup (or Latin square) theory, such as admissibility, prolongation, ortogonality, parastrophy-invariant ortogonality of quasigroups (Latin squares). In his work "*Systems of orthogonal operations*" (Russian and English, Mat. sbornic. v. **77(119)**, №1, 1968, p. 33-52) he established the connection between orthogonal systems of operations and orthogonal systems of quasigroups (OSQ) and studied the parastrophy transformation of an OSQ. His elegant work "*Parastrophy-orthogonal quasigroups*" (Russian, Pre-print, IM AN SSRM, Kishinev, 1983) is devoted to research of the minimal identities in quasigroups, connected with ortogonality of definite quasigroup parastrophes.

Belousov's mathematical works got worldwide recognition and have been representing a source of inspiration for further research. He published six scientific monographs and more than 130 works. His numerous pupils work in many countries. He served on the Editorial Board of "Aequationes Mathematicae" from 1967 to 1975.

V.D.Belousov was not only a scientist. His teaching activity was also important for Moldova mathematics. He was a great personality of Moldavian culture, a person full of generosity, warmth and refinement. Valentin Danilovich Belousov devoted the life to science, a life that will always be an example and impulse for his followers.

The list of Belousov's principle works one can find in the sbornic "*Quasigroups and their systems*" (Russian, Matem. Issled., vyp. **113**, Kishinev, 1990).

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