

V. Shestakov and the Development of Modern Hydrogeology in Russia

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There is hardly any branch of modern hydrogeology in which V. Shestakov has not made a significant impact. He was one of the Russian hydrogeologists who made a smooth transition from Darcy–Dupuit–Boussinesq-based classical groundwater dynamics into modern hydrogeodynamics and modeling. Shestakov's work opened new possibilities and means for solving a wide range of complicated practical problems.

Vsevolod Shestakov was born on July 15, 1927 in Moscow. His early interest in water-related issues was inspired by his father, a talented engineer and Chief of the Water Supply Department in the Moscow Municipality. In 1944, Shestakov entered the Moscow Mining Institute, but shortly afterward switched to the Moscow Engineering Construction Institute. He graduated with honors in 1949 and started working as a junior scientist in the VNI (All-Union Research Institute) VODGEO where his main areas of interest included filtration beneath dams, flooding of underground structures, drainage system design, and groundwater contamination at nuclear facilities.

In the 1950s, a strong team of specialists in the fields of the filtration theory, engineering hydrogeology, and hydromechanics was assembled in VNIIVODGEO. Among them were outstanding scientists such as N. Bindeman and N. Verigin with whom Shestakov exchanged his ideas and plans. He was also acquainted with I. Charny and G. Barenblatt who strongly influenced the young scientist. Shestakov's collaboration with the latter was very fruitful and resulted in interesting findings (Barenblatt and Shestakov 1956).

In 1953, Shestakov completed his Candidate Science dissertation entitled "The study of filtration beneath soil dams." Seven years later, the young scientist took a



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position of associate professor at Moscow State University (MGU), the largest and the most prestigious institution in Russia. In 3 years Shestakov completed and defended a Doctoral Science dissertation titled "The theoretical principles of assessing groundwater backup, drawdown and drainage." Soon it was published as a monograph (Shestakov 1965).

In 1963, Shestakov became acquainted with V. Mironenko. They became friends and collaborators in research and publications until the death of Mironenko in 2000. They introduced the science of hydrogeomechanics, a new discipline dealing with the mechanics of saturated soils and rocks (Mironenko and Shestakov 1974; Shestakov 1998). They also developed various performance techniques and methods for test interpretation (Mironenko and Shestakov 1978). This subject continued to interest Shestakov for many years and resulted in the monograph

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titled “Theory and methods for interpreting pumping test results” (Shestakov and Nevecherya 1998).

In 1967, Shestakov was elected as a Professor in the Department of Hydrogeology at MGU. Five years later, he became the Head of this Department. One of the main problems he encountered in this new capacity was the lack of a modern course and textbook on groundwater dynamics that would showcase the latest achievements in this fast advancing area of hydrogeology. Shestakov filled this need through a course and publishing a textbook on the subject (Shestakov 1973). This book became a standard reference for several generations of students and was reissued several times. In 1995, Shestakov completely revised this textbook and published it under the new title of “Hydrogeodynamics” (Shestakov 1995). The book was reissued again in 2009 with addition of short descriptions of available software packages used for the simulation of various hydrogeodynamic processes (Shestakov 2009).

In his textbooks and numerous articles on hydrogeodynamics Shestakov highlighted the importance of the following critical issues: conceptualization of hydrogeological conditions as the first step in the transition from a field investigation and description of the site to its mathematical simulation; characterization of heterogeneity within the aquifer, aquitard, and vadose zone, and its incorporation into hydrogeological models; and groundwater modeling as a necessary component and tool in hydrogeological research and studies.

As a specialist with broad interests and a teacher with a vision of current and future educational needs, Shestakov fully understood the need for new textbooks not only on groundwater dynamics, but also on other branches of hydrogeology. In collaboration with other departmental members, he published textbooks on the hydrogeology of land reclamation areas (Kats and Shestakov 1992) and other topics.

Shestakov was one of the first Russian hydrogeologists who developed geohydrology, a new branch of hydrogeology dealing with quantitative estimates of groundwater regimes and the evaluation of groundwater resources within the active circulation zone. Shestakov taught geohydrology in the Department of Hydrogeology and published the first textbook on this subject (Shestakov et al. 2003).

For many years Shestakov collaborated with Professor L. Luckner at the Dresden Technical University in studying and modeling groundwater flow. These joint studies resulted in several fundamental monographs. One of them was translated into English, a rare case even after the fall of the Berlin wall (Luckner and Shestakov 1976, 1986, 1991).

In 1988, Shestakov resigned as head of the Department of Hydrogeology at MGU, but remained an active member of the department. He still taught several courses on hydrogeodynamics, the hydrogeology of land reclamation areas, and methods for interpreting test results. Shestakov also continued to be involved in various hydrogeological research (Lomakin et al. 1988; Pozdnyakov

and Shestakov 1998; Nevecherya et al. 2005; Shestakov et al. 2007, 2009).

Shestakov was a member of numerous governmental and non-governmental commissions, councils, supervisory, and editorial boards. Over 50 years, he had taught hundreds of Russian and foreign hydrogeologists, many of whom went on to become well-known scientists in various branches of hydrogeology (I. Pashkovsky, R. Shtengelov, S. Pozdnyakov, A. Roshal, A. Soyfer, and others). Shestakov, who inspired several generations of Russian hydrogeologists, passed away in Moscow on April 29, 2011.

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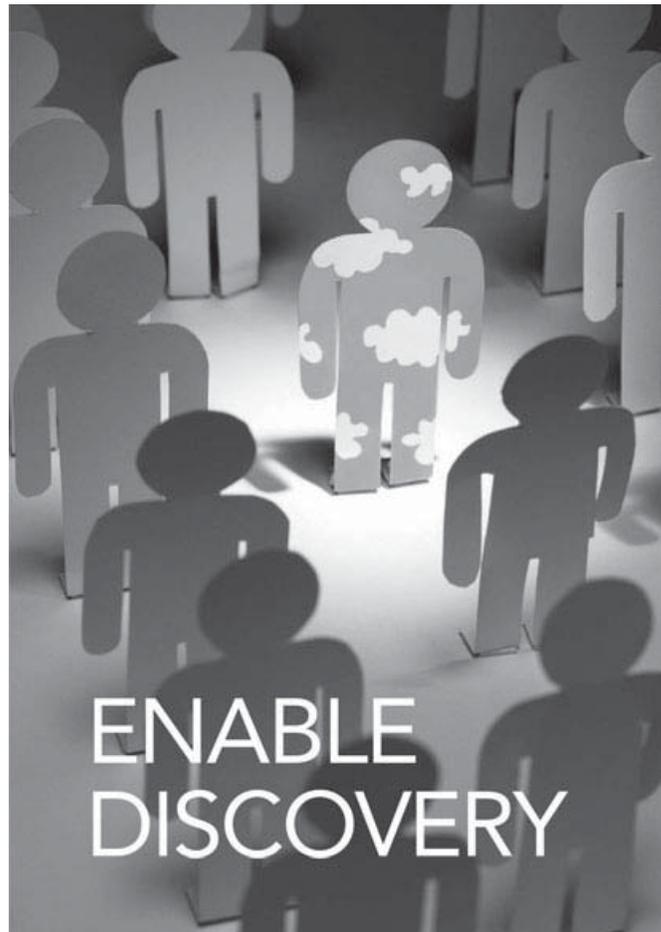
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