Ernst Zaltsberg: hydrogeologist and historian of Russian Science
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Fellow hydrogeologists taking an interest in the history of natural sciences may have come across a series of essays written by Dr. Ernst Zaltsberg. His essays were devoted to a constellation of remarkable Soviet (Russian) hydrogeologists and the schools they created, whose studies are poorly known to the global professional community. The list of publications by Zaltsberg, given at the end of this article, demonstrates his great efforts at introducing the achievements of Russian hydrogeological science, which remained, for a long time, behind the iron curtain.

His works present the biographic facts of Soviet hydrogeologists and accurately reflect the historical and political context of the times, which determined the fate of Zaltsberg himself.

Zaltsberg entered the Faculty of Geology at the Mining Institute in Leningrad (LMI) in 1955. Zaltsberg’s father graduated from this institute before WWII. He also had another passion: he attended music school as a youth, graduating from in with honors, and completed a music teachers’ college (at the same time as the Mining Institute). After graduating from the LMI in 1960,

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Zaltsberg started his work at geological institutions in Leningrad. He studied the effect of groundwater on construction and agriculture, in Leningrad and Northwestern Russia areas. His work as hydrogeologist had no effect on his passion for music and performing, he enrolled in the Rimskii-Korsakov Leningrad State Music Conservatory in 1960. In 1967, he graduated with honors from this prestigious music institution. In 1972, Zaltsberg defended his Ph.D. (Candidate of Science in Russia) dissertation. In the seven years that followed his candidacy, he published several papers and two monographs, which reflected his studies in the field of hydrogeology: Statistical Methods of Forecasting the Natural Regime of Groundwater, Nedra publisher, 1976, and (Regime and Budget of Groundwater of the Humid Zone), Nedra publisher, 1980.

Zaltsberg left the USSR in 1980, after Soviet troops entered Afghanistan. His life continued in Canada. His training as a musician helped him greatly in the first years of adapting to his new country; he taught piano lessons to support himself while transitioning to life in Canada. However, his devotion to hydrogeology pushed him back into the field. Shortly after arriving, Zaltsberg worked as consultant hydrogeologist. He carried out groundwater contamination studies at municipal waste disposal sites at several locations in Ontario and Manitoba. This included the design, installation and operation of monitoring systems. Next (1982-1983), he continued as Research Associate at University of Manitoba, Winnipeg. There he conducted a research study in the Wilson Creek Experimental Watershed within the framework of the International Hydrological Program, and prepared two major proposals for the University of Manitoba titled: "Regional Distribution of Groundwater Resources, Hydrogeological Mapping in Manitoba," and "Groundwater and Droughts in Manitoba". In 1983–1986, Zaltsberg worked as Senior Hydrogeologist in Environmental Hydrology and Engineering Co., in Minneapolis, Minnesota. In that position, he evaluated the long-term groundwater monitoring data over the State of Minnesota, an area measuring more than 218,000 km². He developed forecasting equations, calculated extreme water tables and prepared the final report on regional groundwater forecasting in the continental United States and particularly in Minnesota. In 1986–1988, as Lead Hydrogeologist at Acres International Ltd, in Niagara Falls, Ontario, Zaltsberg assessed remedial investigations and their efficiency at the infamous Love Canal and the 102nd Street landfill, Niagara Falls, N.Y. He identified deficiencies in prior studies and established contaminant loading to the Niagara River. The last and long-
lasting part of Zaltsberg’s career (1988-2002) was with the Ontario Ministry of Environment and Energy where he coordinated and conducted hydrogeological reviews of more than 140 waste sites and deep disposal wells. His experience and knowledge of regional hydrogeology, ground water balance and regime evaluation techniques acquired in Russia served Dr. Zaltsberg well in his North American career. He published a series of articles tackling subjects from regional groundwater characterization and forecasting to methods for groundwater quality evaluation at landfill sites in Canadian, US and International professional periodicals.

In Canada, Zaltsberg resumed cooperation with Russian researchers; in particular, he provided active scientific and methodological support to studies of the properties of Vendian and Cambrian clays as a medium that can be used for nuclear waste disposal in the northwestern part of Russia. The results of this cooperation were presented by Zaltsberg at the Second Canadian Symposium on Aquitard Hydrogeology (2011), and it was planned to use this experience to initiate Russian–Canadian projects for nuclear waste disposal in geological formations. Unfortunately, these plans fell though.

In the years that followed Zaltsberg wrote a remarkable series of essays which offered a profound and mostly undocumented analysis of the development and knowledge of hydrogeological science in Russia, which long faced political barriers in knowledge dissemination with the worlds’ hydrogeological community.

Imperial Russia (and then the Soviet Union) had the economic need to examine and make inventory of natural resources, of which groundwater was greatly important, especially in the vast desert areas of Central Asia and Siberia. Starting with the first expedition in 1733–1743, S. Krasheninnikov and his team documented information on the rivers, lakes and fresh, mineral and thermal springs of Kamchatka peninsula on the Pacific Ocean. Russian explorers researched, analyzed and recorded hydrogeological features of the great territories of their country. In 20th century, Russian hydrogeology was a flourishing science taught in dozens of technical colleges and universities. Zaltsberg presented this history in his review “250 Years of Russian Hydrogeology (1730–1980)”.

Below are the conclusions made by Zaltsberg, who had received his geological education in Russia and acquired the experience in hydrogeological projects both in Russia and in North America (Zaltsberg 2020):

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The development and achievements of hydrogeology in Russia were always based on and closely associated with geology, and with geological surveying and mapping. Geology was and still is the main component of hydrogeological training, study and research in Russia. A multi-theme approach was typical for hydrogeological investigations in Russia. The groundwater origin, occurrence, distribution and chemical composition were studied alongside geological, hydrogeological, hydrological, climatic, topographic, soil and other natural conditions.

Regional investigations and studies were a significant component of the hydrogeological development in Russia. These were conducted by the Academy of Sciences, the Geological Committee, the Federal and Republican Ministries of Geology, the Water Problems Laboratory, the National Institute of Hydrogeology and Engineering Geology, the National Geological Institute and other Institutions. As a result, such problems as regional evaluation of groundwater potentials, regional mapping, regional characteristics of groundwater regimes and balance, and regional groundwater forecasting were studied in depth, and Russian achievements in these fields were impressive.

Solving fundamental scientific problems was always a significant component and driving force behind Russian hydrogeology. For the period from 1960 to 1980 only, several hundred monographs were published in Russia dealing with a variety of topics including planetary and regional hydrogeology, hydrodynamics, hydrochemistry, hydrogeomechanics, groundwater in the permafrost areas and groundwater modelling.

Russia claims to host the largest number of Universities and Institutions teaching hydrogeology. As a result, the Russian hydrogeological community consists of several thousand professional hydrogeologists most of whom have a MSc degree.

The isolation of Russian hydrogeologists from their Western colleagues from the early 1930s to the late 1980s stimulated original investigations and studies to satisfy immediate needs of the industry, agriculture and urban and rural developments. Many achievements of Russian hydrogeologists working on in such fields as regional evaluation of groundwater resources, regional groundwater mapping and forecasting, evaluation of groundwater regimes and balances, regional and planetary hydrogeochemistry remained unknown for many years in the West. The political barriers created by the Cold War were counterproductive for the development of both Russian and Western
hydrogeology. Nowadays the personal contacts and exchange of ideas and literature is common practice.

Considering 250 years of Russian hydrogeology in its broadest context, for much of the timeRussia was more advanced than Western countries in large scale investigations and studies of evaluation and distribution of groundwater resources, groundwater mapping and forecasting, groundwater regimes and balance, and interaction between groundwater and surface water. Russia was also a pioneering country in establishing the national groundwater monitoring network and development of regional groundwater forecasts. The typical Russian approach was always first to get the big hydrogeological picture and use this to help solving site specific problems, rather than to collect piecemeal site-specific information to compile a big picture. The numerous regional studies and investigations resulted in a large amount of fundamental scientific monographs and papers being produced on various aspects of hydrogeology. Unfortunately, many of them remain unknown to the Western hydrogeological community to this day.

In the 1930s, 1940s and 1950s, Russia was behind the West in the field of modern groundwater dynamics. In the 1960s and 1970s Russian hydrogeologists were also behind their Western colleagues in applying numerical methods and modern computer techniques for solving complicated groundwater problems including those in the field of contaminant hydrogeology. However, starting from the late 1970s, Russian groundwater specialists were again in the front line of the international hydrogeological community with regards to their scientific achievements and its practical applications.

Historically being separated from the global professional community, Russian hydrogeologists needed to understand the position and contribution of Russian hydrogeology to the global development of this science. This task was brilliantly fulfilled by Zaltsberg, as can be seen from the above quotation. Moreover, he took care to understand and present characters and dramatic stories of the individuals that led the field, generating ideas and creating flourishing professional schools despite the difficult standards of life in Russia. It happens that way: a monument to the era and a monument to oneself.

In North America, Zaltsberg showed his talents as a writer and publisher. His scientific writing was supplemented by numerous publications about musicians published in journals Clavier, Journal of the Conductors Guild, East
European Jewish Affairs, Strad, as well as by the book «Great Russian Musicians: From Rubinstein to Richter» (Mosaic Press, 2002). Zaltsberg was also a founder and participant of the book series “Jews in the Culture of Russians Abroad” and “Russian Jews Abroad.” In his last years, Zaltsberg was a compiler and editor of the book series “Russian Jews in America” (RJEA)

Sixteenth issue of RJEA series was published by 2017; about 250 articles were published over 15 years. These include many biographic essays devoted to various people – from persons of world-wide fame to utterly forgotten. Professional groups (medical practitioners, teachers, artists, musicians, theater and cinema figures) and socio-political groups. These publications extend our knowledge about the Russian-Jewish emigration, highlight its features and historical facts that have not attracted the attention of researchers.

In September of 2020, the author of those remarkable educational works, which are of undoubted scientific, historical, and cultural value, passed away.

Zaltsberg – the hydrogeologist, musician, and essay writer – is an example of a rich character and of the harmonic development of a person.

In our pragmatic times it is rare to meet someone who takes the time to painstakingly trace the history of ideas and persons who generated them. Ernst Zaltsberg was one of these rare and unheralded people whose impact reaches widely and lasts for decades – a Renaissance man in Russian hydrogeology.

References


