In Memory of Mikhail V. Volkenshtein

Dedicated to the 90th anniversary of his birth and to 10 years after his death.

1912 – 1992

Professor and Associated Member of the USSR Academy of Sciences Mikhail V. Volkenshtein was an outstanding scientist well known by his work in physics, chemistry, and biophysics.

Two scientific sessions of this Symposium were dedicated to the memory of this great scientist and opened with the lecture of Tatiana M. Birshtein. In the archive of T. M. Birshtein there is a letter by M. V. Volkenshtein, which was written in 1982 in reply on her request to present some necessary information for the paper in Polymer Science (Russia) dedicated to the 70th anniversary of his birth. This letter gives one a good idea about both the scientific activity and bright personality of the author.

T. M. Birshtein and A. A. Mercurieva translated the document and prepared this publication. The main text of the letter is below, it is typed by *Italic* to be distinguished from the comments.

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Volkenshtein about Volkenshtein

Here are the main points of my professional biography

Moscow Period

1930 – 1935 student of the Physics Department of Moscow State University

1933 – 1941 first experience in research, namely, experiments in Raman light scattering at Karpov Institute of Physical Chemistry, Moscow

Period of World War II and evacuation in Siberia

1941 – 1942 an industrial plant in Siberia where I had made an important invention in the appropriate field of chemistry

Return to scientific work (Siberia and removal to Leningrad)

1942 – 1948 State Optical Institute, Leningrad

Leningrad and Polymer Period

1948 – 1967 Institute of Macromolecular Compounds, Leningrad

In 1948, Volkenshtein organized the Laboratory of Polymer Physics at the new Institute of the USSR Academy of Sciences. He formulated a fruitful concept of the rotational-isomer mechanism of flexibility of polymer chains. This model was the base of the statistical theory of macromolecules developed in the works of Volkenshtein and his followers. Researchers of the laboratory headed by Volkenshtein developed a large number of physical methods for the study of polymer structure, such as spectroscopy, nuclear magnetic resonance, calorimetry, luminescence, spectropolarimetry, and later, magnetic circular dichroism. Most of these investigations were pioneering works that led to the development of new directions of the scientific research. Many of the leading laboratories in the Institute of Macromolecular Compounds originated from the 'primary' laboratory organized by Volkenshtein. There was also a theoretical group in the laboratory of Volkenshtein. This group consisted of the only one student O. B. Ptitsyn at first but quickly expanded. This group was one of the first or even the first in the world theoretical group in the polymer science. This group started the St.Petersburg school of the polymer theory leaded now by T. M. Birshtein, Yu. Ya. Gotlib,

and A. A. Darinskii who are the organizers of this one and three previous international symposiums 'Molecular order and Mobility' in Polymer Systems'.

Moscow Period

From 1967 – Institute of Molecular Biology and Institute of Biophysics, Puschino

Teaching

1945 – 1953 and 1963 – 1967 Leningrad State University

1954 – 1963 Pedagogical Institute, Leningrad

From 1968 – Moscow Institute of Physics and Technology

Awards

1950 – Stalin Prize

1975 – Order of the Badge of Honour

Monographs

There are 15 monographs in Russian and 35 including translated editions.

The main ones are the following:	*Translated editions*
1949 – Vibrations of Molecules, two volumes (with M. A. Elyashevich and B. I. Stepanov), Stalin Prize in 1950	
1973 – revised edition of the same book with Elyashevich, Stepanov, and Gribov	*Hungary*
1951 – Molecular Optics	*China*
1955 - Structure and Physical Properties of Molecules	*GDR, China, Czechoslovakia*
1959 – Configurational Statistics of Polymer Chains	*USA*

From Introduction written by P. J. Flory for Russian edition of his monograph 'Statistical Mechanics of Chain Molecules':

This monograph is the third book devoted to the problem under consideration. 'Configurational Statistics of Polymer Chains' by M. V. Volkenshtein was published in 1959 and laid the foundations for both strict and realistic consideration of spatial configurations of chain molecules, this being a key problem for molecular interpretation of the behavior of polymer materials. After overcoming great difficulties, very important relations with great knowledge about small molecules were established in his book. The next book 'Conformations of Macromolecules' written by T. M. Birshtein and O. B. Ptitsyn was published in 1964 with further development of the consideration of polymer chains with account of the molecular structure. ... The both monographs were translated into English and thus their accessibility for non-Russian speaking scientists stimulated further investigations in this field. The both books promoted recognition of the importance of the problem. If my monograph corresponds to the standards given by the preceding ones, then its accessibility for Russian scientists is really encouraging. This is a response to the English translation of the two preceding monographs.

1965 – Molecules and Life *USA, GDR, Poland*

1967 – Physics of Enzymes *USA, Japan, Poland, GDR*

1975 – Molecular Biophysics *USA*

1978 – General Biophysics *USA*

1981 – Biophysics (a text-book)

The rest of the books are popular.

What do I consider to be the most important?

- *Theory of Raman and IR spectra intensities.*

- *Statistical mechanics of macromolecules, and Rotational Isomeric Theory in particular.*
- *Further developments of these ideas in physics of biopolymers and the concept of electron-conformation interactions (ECI), conformon.*
- *Magnetooptical rotation and Magnetic Circular Dichroism of heme-containing proteins.*
- *Physical meaning of the genetic code.*
- *Application of information theory to biological evolution and analysis of the information value.*
- *Application of the molecular orbital method to enzymology based on the concept of electron-conformation interactions.*

I consider this information to be enough.

Meanwhile I should say that it is quite sickening not only to be aware of being seventy, but also to advertise this sordid fact.

Regards!
Yours, MV

Finally, let us mention that Volkenshtein was an extremely gifted and educated person in general. He was greatly interested in various aspects of human life and never restricted his interests only to pure science – he issued popular books, painted watercolors, wrote serious and merry poems, was interested in general scientific and public activities. Being as brave as talented, he always resisted all efforts of pseudo-science to affect scientific life in the former Soviet Union. His role in intellectual and scientific life of the passed XX century is significant and his name remains in history and science.