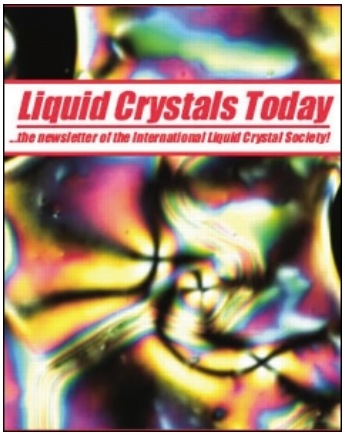

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The Life and Times of Vsevolod Konstantinovich Frederiks: 1885–1944

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Vsevolod Konstantinovich Frederiks (*aka* Freedericksz) is well known as one of the talented theorists, experimenters and engineers, who contributed a great deal to both Solid State Physics and Liquid Crystals. V.K. Frederiks was born in 1885 and graduated from Geneva University in Switzerland. His first work was together with such famous and world-known scientists as French Academician G.-E. Guye, the German Professor W. Voigt and Nobel Prize Winner mathematician D. Hilbert. In 1909 Frederiks defended his Doctoral Degree from Geneva University, and his thesis was concerned with the measurement of the viscosities of metals at low temperatures. Frederiks showed himself to be an excellent experimenter, who at the same time was well aware of the existing theories, and who could contribute to the theories himself.

V.K. Frederiks returned to Russia just after the October Revolution in summer 1918. He was full of enthusiasm and began to carry out a new programme at Petrograd's Polytechnical and Optical Institutes aimed at the investigation of piezoelectricity and liquid crystals. As a well educated physicist Frederiks also published on general problems of physics, such as the theory of relativity, quantum mechanics and electrodynamics. His first work on liquid crystals was together with A. Repiewa in 1926, which was presented in the 6th Congress of Russian Physicists entitled: 'On the theory of anisotropic fluids and some new observations of them'. The aim of the work was a verification of the theory of M. Born, which identified the dipole–dipole interaction as the most important in liquid crystals, thus predicting the appearance of polar 'head-to-tail' liquid crystal structures in electric fields. V.K. Frederiks and A. Repiewa devised an experiment which clearly showed that in the confined geometry between two glass plates, a liquid crystal reorients parallel to the external magnetic field tending to change the initial homogeneous alignment set on the substrates. The threshold magnetic field, obtained by Frederiks in this and subsequent works proves to be proportional to the inverse square root of the liquid crystal diamagnetic anisotropy, which was positive in his case. The pioneering character of these researches was recognized by Nobel Prize Winner P.G. de Gennes, and so this class of effects are known as 'Frederiks transitions'.

In 1931 Frederiks continued his studies of the behaviour of liquid crystals in electric fields and was probably the first to discover the appearance of the periodic hydrodynamic domains. Later these domains were called Williams or Kapustin–Williams domains due to the names of scientists who observed them at the beginning of the 60s. Macroscopic turbulent flow in an electric field which was called the 'Dynamic Scattering Effect' by G. Heilmeier and co-authors in 1968 was also first observed by Frederiks and published by him together with V. Zolina and V.

Zwetkoff at the beginning of the 30s. In his first work V.K. Frederiks assumed with the Born cluster model for liquid crystals, but later he changed his opinion to the H. Zocher hypothesis of the continuum theory. In October 1936 V.K. Frederiks was full of plans for liquid crystal research when he was arrested. Subjected to heavy psychological and physical pressure, he 'confessed' that he was guilty of preparing terrorist acts against the Soviet regime and personally against the General Secretary of the Communist Party, Josef Stalin. Such accusations were usual at this time and Frederiks was sentenced to ten years in prison. Even in these conditions Frederiks did not lose his interest in liquid crystals, and his letters from the prison testified to this. V.K. Frederiks died in prison from pneumonia on 6 January 1944. In 1956 his innocence was officially recognized by the High Court of the USSR. The name of Vsevolod Konstantinovich Frederiks will remain one of the most important names in the history of liquid crystal research both in Russia and all over the world.

In conclusion it is a pleasure to acknowledge the book of Professor Anatoliy S. Sonin, *Vsevolod Konstantinovich Frederiks* (Nauka, Moscow, 1995) which was kindly presented to one of us. The life of Frederiks is very well described in this book, which we recommend all the members of the Liquid Crystal Society to read. We also would like to draw attention to publications, which show the priority of Frederiks in the very important liquid crystal research mentioned above.

1. Freedericksz, V., and Repiewa, A., 1927, Theoretisches und Experimentalles zur Frage nach der Natur der anisotropen Flussigkeiten. *Physik. Zeitschr.*, **42**, 532–546.
2. Freedericksz, V., and Zolina, V., 1933, Forces causing the orientation of an anisotropic liquid. *Trans. Faraday Soc.*, **29**, 919–928.
3. Freedericksz, V., and Zwetkoff, V., 1935, Uber die Einwirkung des elektrischen Feldes auf anisotrope Flussigkeiten. *Acta physicochim. URSS*, **3** (6), 879–894, 895–912.

VIIth International Topical Meeting on Optics of Liquid Crystals

8–12 September 1997

Hotel 'Am Bruchsee', Heppenheim, Germany

Scientific Programme

The conference is devoted to the optics of liquid crystals and will cover the following topics:

- General linear optics
- Nonlinear optics
- Surfaces and interfaces
- Composites and confined systems
- Liquid crystal photonics
- LC and waveguides
- Dyes and photo chemistry
- Instabilities and pattern formation

Conference location

The 7th OLC will be held in the small and romantic wine town Heppenheim. It is located at the 'Bergstrasse' in Hesse, a small wine region with a very mild climate, close to Heidelberg (20 km) and quite near Frankfurt and its central airport (50 km). It can be reached very easily by car or by train. The Hotel 'Am Bruchsee' is located directly at a small lake and offers the entire meeting facilities and leisure facilities such as sauna, solarium, gymnasium and a bar.

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