

Boris Ieremievich Verkin-on his 90th birthday (1919–1990)

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Dear Reader! The issue in your hands is dedicated to the memory of Boris Ieremievich Verkin—a talented scientist, outstanding organizer of science, and founder of the Institute for Low Temperature Physics and Engineering and the journal in front of you. If he were alive today, BI—as anyone participating, even peripherally, in his ebullient work called him—would have turned 90 on August 8, 2009.

BI was one of those rare people who can think on a large scale, dream on no less a scale, and bring their dreams to fruition. I. V. Kurchatov and S. P. Kovalev emerged from their ranks. But there is a nuance here. At that time mastery over nuclear energy and space symbolized our country's vitality and system and these fields were supported by practically unlimited financing. Had these legendary leaders of their respective fields not been in the right place at the right time the country would have pursued other endeavors. And all the problems raised would have been solved, though it may have taken slightly longer.

However, I see the epic work involved in organizing the Institute for Low-Temperature Physics and Engineering differently. I do not doubt that all participants of the initiating

group worked hard. Without Leonardo we would never have seen Mona Lisa's smile. And, judging from the subsequent course of history, without BI an institute of such a great size would never have been built. For the highest officials of our country which was drawn into the space race (and the arms race) the advancement of physics and even low-temperature engineering would hardly seem all that important. I do not know who got the ingenious, at that time, idea that helium cryogenics is a wonderful tool for creating ground-based simulators of space conditions. But it was BI who was able to convince the chief designer of space vehicles of this and to prove by actual deeds that this is no bluff. Such simulators were soon built at the cost of the irreplaceable expenditure of his nervous energy.

The incorporation of the not yet functioning institute into the space program gave BI's ideas the funding they needed. Accelerated construction of housing and manufacturing buildings, providing excellent (for that time) equipment, skillful publicity (and this was at the beginning of the 1960s!), and unlimited possibilities for professional advancement drew like a magnet many talented young people, dying

to get into science, into the team being born. But even this is not enough! The initial directions of research that can advance under their momentum and attract energetic leaders who are not afraid of their subordinates' accomplishments must be formulated. Thanks to his erudition, excellent understanding of people, and ability to look far into the future, BI handled these problems almost perfectly. In very short order, having taken its rightful place in the space program the institute also won authority in fundamental research, which was of special concern to BI. There is no need to list all the problems of low-temperature physics in which Boris Ieremievich was involved—it is enough to read all the headings in the journal *Low-Temperature Physics*.

BI steadfastly believed in very extensive possibilities for industrial applications of superconductor technologies. His efforts to develop superconducting electric-machine engineering are reminiscent of the work performed by Korolev's group studying jet propulsion. Certainly, they were ahead of their time; only a breakthrough in the technological synthesis of materials which are appropriate for the problem will make it possible to realize these ideas fully. Evidently, he counted on this in the last few years of his life, when he enthusiastically embraced the advent of the HTSC era.

A few things did not work out. I do not know why BI refused to develop the Institute's own technological base for synthesizing new materials for low-temperature research. Judging from the early publications, including research on

zone methods of purification, he understood the importance of such work very well. Evidently, he counted on cooperation within the academy. Or, most likely, he could not find at the right time an effective leader for such a mission. The consequences of this are especially noticeable today. Though its scientific potential is still enormous the Institute often must settle for second place, suffering a severe shortage of contemporary "hot" objects for research, not to mention the discovery of new compounds with unusual properties, attracting the attention of the entire scientific community.

V. D. Fil'

The present issue is devoted to the electronic properties of conducting systems. This choice is by no means accidental—Boris Ieremievich Verkin's first scientific successes are concerned with research on quantum oscillations previously observed only in bismuth and a large number of normal metals. These works, which were performed in close collaboration with Schoenberg's group, served as the first step in the creation of the modern theory of conducting systems through the efforts of many subsequent researchers. The editorial board is hopeful that the articles in this issue will give the reader at least a partial picture of the status of this fascinating field of low-temperature physics.

We are sincerely grateful to all authors who accepted our invitation to participate in this issue.

Editorial board