Physics à la Russe

Reflections on Liquid Helium. E. L. ANDRONIKASHVILI. American Institute of Physics, New York, 1990. x, 317 pp., illus. $60. AIP Translation Series. Translated, with additions by the author, from the Russian edition (Tbilisi, 1980) by Robert Berman.

Discussing one of the many times he falls in love in this volume, Elevter Andronikashvili describes the young lady in question as "she, who shared with liquid helium the ability to make me enjoy myself." If this seems to you (as it does to me) a perfectly sensible way of describing the sensation of young love, then you probably should read this book.

The problem of superfluidity in liquid helium beguiled some of the world's best physicists. There was never the slightest hope of practical applications, or even that the solution to the problem would illuminate other areas of science. There was only the lure of the problem itself. Nevertheless, Landau, Feynman, Onsager, Kapitsa and Peshkov, Hall and Vinen, the Fairbanks brothers, Russell Donnelly (who wrote an introduction to this volume), and countless others of the best and the brightest all over the world were drawn inexorably into it. Andronikashvili certainly belongs in the pantheon of the heroes of helium, and that strange episode forms the backdrop of this highly personal, curious, and entertaining book.

In 1939, Andronikashvili was invited to spend a year—18 months at the most—at Petr Kapitsa's famous Institute of Physical Problems in Moscow. By the time he left in 1948 he had obtained his doctorate and performed the celebrated experiment that forced low-temperature physicists all over the world to learn to pronounce his name. In essence he proved the correctness of Lev Landau's two-fluid model, or, as he says, demonstrated the fact that superfluid helium could move and stand still at the same time.

The book is a collection of sketches, stories, and reminiscences that together form an intimate scientific and social autobiography of the life and times of a Soviet scientist. Somewhat along the lines of Heisenberg's *Physics and Beyond*, it makes frequent use of verbatim dialogue, reconstructing in detail conversations that took place as much as 50 years ago. The rather crude translation often adds to the charm of the volume by suggesting the original Russian rather than slick, colloquial English. Unfortunately, many stories and some scientific explanations seem to lose their meaning in translation. Figure out what this means, for example:

> I absolutely do not know when Landau worked. Only, what happened during those hours when he was closeted with Zhenya Lifshitz remained unobserved.

On the other hand, some exchanges are universal. Young Andronikashvili asks Kapitsa why the paper on what would become his famous experiment has not been sent off for publication. Kapitsa responds by asking why Andronikashvili went off to his native Tbilisi before presenting a seminar on the subject.

> "I had a cold, Petr Leonidovitch—"
> "Your cold, was it a blond or a brunette?"
> "More of a brunette."

Incidentally, Andronikashvili apparently remains a bachelor to this day.

The book spans a time, 1939 through the 1960s, when a number of interesting events took place in the Soviet Union and on the world scene. These events pass almost unnoticed, but we do read at length about other rivalries: Soviet versus Western science, Georgian versus Russian nationality, even a bit of Landau versus Feynman. It may be, however, that political commentary is present in a form more subtle than we Westerners are accustomed to reading. For example, not a word is said about why or how Kapitsa left Cambridge to set up his institute in Moscow. But we are told that, in 1948, Andronikashvili is virtually shanghaied, under orders of the Central Committee, to leave Moscow and return to his native Tbilisi, where he wins considerable fame and honor as the father of Georgian science. All of this bears a strong resemblance to Kapitsa's story.

Every now and then, we do get a glimpse of the political situation. At Landau's 50th birthday party, a deck of cards is presented. Landau is portrayed on all the aces and his wife, Kora, on the queens. The jacks are his students. The kings are his illustrious former students, all except one card with only a single picture. "The empty place was reserved for a scientist 'excommunicated from the church,' whose portrait the other students did not dare make." Nor does Andronikashvili, writing in 1980, tell us the name of the outcast.

Visiting England in 1958, he notes the meadows, gardens, and woods of the English countryside. "Fences and hedges separated these into squares of uneven sizes," he sniffs, "a distinctive reflection of private property." By this time, Andronikashvili is a Stalin Prize winner, director of the institute and head of the physics department at Tbilisi, academician of the Georgian Academy, and deputy of the Georgian Supreme Soviet. He has a maid and a chauffeur. He records that his host, Philip Sykes, a director of the vast firm British Oxygen, is obliged to have his own children clear the table. Later, visiting Scotland, he is sensitive to the Scots' resentment of the English. But, seeing the ruins of St. Andrews Cathedral, he compares it mentally to the much smaller Georgian monasteries and decides that Scotland was part of "a colonial power that got rich at the expense of other nations."

The book has in it a number of real howlers. Richard Feynman, we are told, was "a passionate hunter and fisherman." About equally likely, we also learn that Copernicus spent half his life in Poland and half in Scotland. My guess is that this last was planted by Jack Allen, discoverer, along with Meissner and Kapitsa, of superfluidity and Andronikashvili's host at St. Andrews. I can see Allen reading this book and rubbing his hands in glee. Alas, it is too late to find out for sure who planted the Feynman story.

The point is, what we read in this book is not necessarily what is true or accurate, but it is what Elevter Andronikashvili saw and thought. He is proud and chauvinistic, and he wins every scientific argument that comes his way. On the other hand, he is never mean-spirited, he never loses his sense of humor, and in the end we can't help liking him.

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Equations of Sport

The Mathematics of Projectiles in Sport. NEVILLE DE MESTRE. Cambridge University Press, New York, 1990. xii, 175 pp., illus. Paper, $22.95. Australian Mathematical Society Lecture Series, vol. 6.

Physics students are traditionally introduced to the topic of projectile motion very early in the game, usually within the first few weeks of the freshman physics course. Typically, students are presented with a set of equations describing such quantities as velocity, time of flight, and horizontal range and are then assigned a set of homework