

Not Even Wrong



Book Reviews

Posted on September 7, 2007 by [woit](#)

Felix Berezin

Misha Shifman has edited a wonderful book about the mathematician Felix Berezin, which recently appeared with the title [Felix Berezin: Life and Death of the Mastermind of Supermathematics](#). Berezin was a Soviet mathematician largely responsible for many new ideas about “supermathematics”, working out the analog for anticommuting variables of many standard concepts in analysis. Path integrals for fermions crucially use an analog of the standard integral that is now known as the Berezin integral.

Berezin began his mathematical career working with Gelfand on representation theory. While Gelfand thought very highly of him, at some point the two of them had a falling out, which is alluded to without any details in several of the contributions to this book. Since Berezin’s mother was Jewish, his professional life was often difficult due to the anti-semitism that was prevalent in the Soviet mathematical establishment. Between this and being on the outs with Gelfand, he had continual problems with things like getting his papers published, as well as being able to travel or effectively communicate with people in the West.

Tragically, Berezin died at the age of 49, under somewhat unclear circumstances on a trip to Siberia he took with a geological team. The largest segment of the book is a wonderful and touching piece by Elena Karpel, who lived with him for many years (they had a daughter together, Natasha). Karpel describes their life together in detail, as well as the circumstances following his death. It is a moving portrayal of a complex relationship of two highly intelligent and cultured people, with one of them, Berezin, extremely seriously devoted to his work, one cause of stress in his relations with Karpel. Together with contributions from his colleagues, the book gives a fascinating portrayal of the mathematical culture that Berezin was an important part of.

With his interest in quantum mechanics, quantum field theory, path integrals, and anticommuting variables, Berezin helped to transform the field of mathematical physics into something much more modern. His book written during the sixties, *The Method of Second Quantization* remains one of the classics of quantum field theory. I remember being especially impressed by his paper with Marinov *Particle spin dynamics as the Grassmann variant of classical mechanics*, which gives an amazing interpretation of the physics of a spin-1/2 particle by invoking anti-commuting variables in a very simple way. The book contains a summary of some of Berezin’s scientific work by Andrei Losev, and this article is available [on-line](#).