

Israel Berstein

June 23, 1926 — September 22, 1991

The death of Israel Berstein on September 22, 1991 brought to a sad conclusion the heroic battle he had waged against Parkinson's Disease for over twenty-five years. He left behind a personal legacy of sparkling humor, mathematical breadth and brilliance, and a professional and personal generosity and optimism that will always be treasured by those who knew him.

Israel Berstein was born in 1926 in the town of Briceni, Bessarabia, which was then part of Rumania. The Soviet Union occupied Bessarabia in 1940, and in the same year the K.G.B. deported Berstein's father, Ephraim, to Siberia. He was never heard from again. A Rumanian and German occupation followed. The Berstein family, which consisted of Israel, his mother Hannah, and his sister Gita, took refuge with Rumanian friends and was thereby able to escape the roundup of Jews that routinely accompanied such occupations. With the reversal of German fortunes in the war came another Russian occupation in 1944. This liberation resulted in Berstein's induction into the Red Army. In the first week of action, however, he was severely wounded. Not only did those wounds cause major back injuries and the amputation of his right leg, but they also led to a severe case of bone tuberculosis, which kept him continuously hospitalized well into 1947. His family credits Berstein's survival at that time to the assistance of American relatives, who were able to supply desperately needed antibiotics. But Berstein did more than survive. He continued his school studies in the hospital and was so successful that shortly after his release he was admitted to the University of Bucharest, from which he received a degree in September, 1954.

Israel Berstein's professional career began in 1954 at the Institute of Mathematics of the Rumanian Academy of Sciences, where he was the star pupil of Simion Stoilov, the leading Rumanian mathematician of his generation. He specialized in analytic function theory and topology, and later exclusively in topology, receiving his doctorate on June 13, 1958. Already at that point he and his mentor, Tudor Ganea, were the two leading algebraic topologists in Rumania. Later that year at an international conference on geometry and topology in Iasi, Rumania, both Berstein and Ganea made the acquaintance of the British mathematician Peter Hilton. This encounter was the beginning of long mathematical collaborations for the three as well as lifelong friendships. Each of the three emigrated soon thereafter, Berstein to Israel in 1961, Ganea to Western Europe in the same year, and Hilton to the United States, to Cornell University, in 1962. In fact, in the year prior to coming to Cornell, Hilton had succeeded in arranging for Berstein to accompany him. Thus, in Fall 1962 Israel Berstein was appointed an Assistant Professor in the

Mathematics Department at Cornell. It was immediately clear to colleagues both at Cornell and outside that this position was insufficient for someone of his mathematical stature and talents. And so in 1963 Berstein was promoted to an Associate Professorship, and four years later he became a Full Professor.

Israel Berstein's mathematical work was primarily in the area of homotopy theory, a subbranch of algebraic topology that studies the properties of spaces remaining invariant under continuous deformation. His earliest contributions, which were collaborative efforts with Ganea, involved the study of so-called Lyusternik-Schirelman (L-S) category, a numerical measure of the homotopy-theoretic simplicity of a topological space. This notion has applications to many areas of topology, as well as to other subjects, notably to the study of singularities of real-valued functions. In his work on L-S category, first with Ganea, and later on his own and in collaboration with Hilton, Berstein contributed many important insights, extensions, examples and applications, becoming the foremost authority in the world on this subject.

It would be inaccurate, however, to leave the impression that Berstein's career was characterized by a single-minded devotion to one topic. On the contrary, his interests in topology were very diverse and his knowledge of the literature and the state of the art in many areas was extraordinarily deep and accurate. In addition to his work on L-S category and related topics in homotopy theory, Berstein made significant contributions to differential topology, the theory of group actions on manifolds, and to the theory of branched coverings.

A quick glance at the list of Berstein's published papers will reveal that close to two-thirds of his postdoctoral papers were collaborative efforts. This was because Berstein loved mathematics in both its human and personal aspects and its theoretical aspects. He loved to talk about mathematics and to discuss and share mathematical ideas. From this point of view, he was extraordinarily generous with his time, energy, and talent. Certainly a significant number of his collaborative publications arose from the many such discussions held in his office. But the published record does not show the countless suggestions, queries, tips, ideas, and attempted proofs that arose in that forum to the benefit of all who were there, both students and colleagues.

With a similar spirit and expertise, Berstein ran the Department's Senior Honors Seminar and a topology literature seminar for graduate students. This last, known informally as "The Berstein Seminar," was of great importance in the education of several generations of topologists, including one (now senior) member of the faculty. The Department has continued this seminar, now formally naming it "The Berstein Seminar" in his honor.

Israel Berstein's mathematical breadth, insight, and sharpness were widely known and appreciated. A story is often told about a former colleague who was advising a prospective visitor to Cornell as to how one organizes a general mathematics colloquium talk at Cornell. "For the first half hour," the ex-colleague advised, "make sure that everyone can follow you. The next fifteen minutes are for the experts. Then, the following ten minutes are for you and Berstein. And the final five minutes are for Berstein alone." This story not only captures some of the brilliance of Israel Berstein, as well as the humor that was always part of his life, but also, it accurately suggests the high esteem in which he was held by his colleagues and the affection they felt for him.

Throughout a life constantly plagued with serious misfortunes, Israel Berstein was always an optimist. He considered himself a very lucky man. Lucky in the family, friends, and colleagues that he had, in the opportunities that he had, and in the life he was able to lead here at Cornell. And in turn, he was generous to all who knew him. From childhood on he was a major source of help and support for his mother and sister. He also assisted a number of Rumanian mathematicians, former school friends, in emigrating to the West. He was devoted to students throughout his career, and, they returned his sentiments. One of his happiest teaching moments, for example, occurred when a group of students awarded him a plaque of appreciation which read:

"BERSTEIN EVER GEOMETRIZES"
For your humor, kindness, and patience, to you
Professor our lasting admiration and gratitude.
With fondness, Math 452, 1966.

The 1992 Cornell Topology Festival was dedicated to the memory of Israel Berstein. The keynote lecture was given by Peter Hilton who finished his talk with the statement, "I do not expect in my lifetime to meet someone comparable."

Israel Berstein is gone, and we shall have to work our way through "the last five minutes" without him.

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