OBITUARIES

Neil William Ashcroft

Neil William Ashcroft was born in London on 27 November 1938. He had childhood memories of blackouts and bombings during World War II. Two years after the war, his family settled in New Zealand, where he received BSc and MSc degrees in mathematics and physics from what is now the Victoria University of Wellington. He did his 1964 PhD at Cambridge University with John Ziman and Volker Heine. His thesis contained one of the earliest calculations of the Fermi surface of aluminium. In the US he enjoyed explaining that aluminium was a "transatlantic isotope" of aluminum.

In 1965 Neil went to Cornell University as a postdoc. He joined the faculty in 1966, and he remained a member of the physics department for the rest of his life. After a long, debilitating illness, he died of pneumonia in Ithaca, New York, on 15 March 2021.

Neil's wide-ranging research included density functional theory, matter under extreme pressures, high-temperature superconductivity, metallic hydrogen and its alloys, and metal–insulator transitions. After his retirement in 2006, he joined the Cornell research group of Roald Hoffmann and collaborated on almost 50 joint papers. Roald said that "Neil was wise and perceptive, fascinated by the border between chemistry and physics. We valued his physical insight and remember his gentle wit."

In 1968 Neil proposed that hydrogen would become metallic, and a high-temperature superconductor, at ultrahigh pressures. Three decades later experimentalists showed that hydrogen molecules did indeed metallize. When Neil's research group predicted in the 1990s that highly compressed lithium would change from a highly symmetric, close-packed structure to a less symmetrical form with more conduction electrons per atom, that surprising transition was quickly confirmed. Two decades ago he predicted that hydrogen-enriched metallic elements would become ultrahigh-temperature superconductors under extreme pressures. In the past six years, that, too, has been confirmed: Several research groups achieved record high temperatures—room temperature and above—with superconducting LaH_{10} and SH_3.

Neil was a talented administrator. He was director of Cornell's Laboratory of Atomic and Solid State Physics in 1979–84 and of the Cornell Center for Materials Research in 1997–2000. He played a vital role in launching the Cornell High Energy Synchrotron Source and served as its coprincipal investigator and associate director in 1978–89 and its deputy director in 1990–97.

We became close friends soon after Neil arrived at Cornell. The happiest years of my professional life were 1968–76 when we wrote and saw into print our book, *Solid State Physics*. Neil was fascinated with materials: Each was like a personal friend. I had little interest in or knowledge of particular materials, but I was fascinated by the conceptual structure that encompassed them all.

So Neil wrote almost all the first drafts. I would rarely understand what general issue he was trying to get at and would revise it into something that made sense to me. Neil would then correct all the mistakes I had introduced. Back and forth we went, slowly converging on something that looked good to us both. That was before the age of personal computers. I typed every page on a state-of-the-art IBM bouncing-ball typewriter, making revisions with a white "erasing ribbon" and redoing entire pages when revisions were major.

Neil had a wonderful sense of humor. He was a fine mimic and did a superb Hans Bethe. We had great fun dealing with each other's idiosyncrasies throughout the process, and our fun permeates the book. That might explain why it's still thriving, still in its original edition, 45 years after it came out. In 1990 I remarked to Hans that Ashcroft and Mermin, as the book became known, was still in its first edition. He said it showed "the stability of the subject." True enough, but I believe it's also because unlike almost all technical books, ours *entertains* the reader just as Neil and I entertained each other during our six years of writing.

Neil William Ashcroft

LINDSAY FRANCE/CORNELL UNIVERSITY

We even had fun reading page proofs and making our enormous index. Every entry was written by hand on "3-by-5 cards." If we stacked them, the pile would have been a couple of meters high. Neil's favorite index entry is "Cart, before horse, 92," followed nine pages later by "Horse, after cart, 92." My favorite, on page 808, is "Exclamation marks, 61, 185, 219, 224 (twice!), 291, 305, 403, 808." You see here the difference in our styles. The book itself has a uniform tone that is neither of ours, because we negotiated almost every word.

My only other collaboration with Neil was a short memorial article in 2006, "Hans Bethe's contributions to solid-state physics." Our revisions, re-revisions, and re-re-revisions were unbelievably easier in the modern era, but just as extensive. We realized that we no longer had the energy to write a second edition of our book, even had we thought one was needed.

PHYSICS TODAY does not list professional honors in its obituaries, but the distinction of Neil that I really envy is "Foreign Member of the Russian Academy of Sciences." (Russia, are you listening?)

He would have enjoyed this joke. I miss Neil enormously.

N. David Mermin
Cornell University
Ithaca, New York