Memories of Lee and Reppy

N. David Mermin¹

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When I arrived at Cornell as a theorist in 1964, I must have thought of myself as a low-temperature physicist, since shortly thereafter I attended LT9, the IXth International Conference on Low Temperature Physics. I can't imagine why I did. My PhD thesis was not in low-temperature physics, and I had never published anything in the field. I didn't for another three years.

Dave Lee must have thought I was in low-temperature physics too, since he welcomed me as if we were not only old friends, but close professional colleagues. All I knew about him was the rumor that when they started to excavate for the new physics building, Clark Hall, Dave's lab in Rockefeller Hall fell into the hole. To this day I don't know if it really happened. Dave has the office next to mine, but he hasn't returned to Ithaca from Texas since the pandemic began, so I haven't had a chance to ask him.

Dave assumed, when we met, that I knew far more than I did. I worried that when he realized this, he would abandon me. He never did. It was important for my intellectual development to have an experimentalist friend. In my graduate study at Harvard and during my three postdoctoral years with Rudolf Peierls and Walter Kohn, I had never talked to an experimentalist except as a classroom teacher, or on social occasions.

When John Reppy arrived at Cornell as a tenured member of the Department, two years after I came as an Assistant Professor, he took me as seriously as Dave did. They had both been associated with the University of Connecticut. Since I was born and raised in Connecticut, I felt this as a kind of bond between us. John even took me to his lab, to show me his rotating turntable. More and more, I felt like a low-temperature physicist. A year after John came, Bob Richardson arrived as a postdoc. He was appointed to the faculty a year later, and there we all were, me and my three low-temperature-physics friends and colleagues.

My first paper in low-temperature physics was in 1967, a rigorous proof that zero-sound necessarily existed in any neutral Fermi liquid, either as a density or a spin density wave. Since the density wave had recently been observed in liquid ³He,

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✉ N. David Mermin
ndm4@cornell.edu

¹ Professor Emeritus of Physics, Cornell University, Ithaca, NY 14853, USA

the only neutral Fermi liquid, I doubt my three friends found it of much interest. But it did earn me a letter from a young theory postdoc at Illinois named Tony Leggett, who was later to spend a lot of time visiting Ithaca, where he had a major impact on all four of us.

In 1970–1971 I spent my first sabbatical in Rome, thinking about statistical mechanics, working on Ashcroft & Mermin, and learning about Renaissance architecture. While I was away, remarkable things were happening at Cornell. As I later put it, “In 1971, in Ithaca, New York, was born the greatest source of entertainment for theoretical physicists since the Dirac equation. Only those too busy to look up from their computer printouts will think I mean the renormalization group. For the best kind of fun—the kind to be had counting on your fingers—you can’t beat superfluid ^3He .” [Physica 90B (1977)1–10].

When I returned to Ithaca, the field Ken Wilson had invented was far too active for my taste. But the theory of superfluid ^3He was just starting to be explored. That is the state of a subject I like best. So having been assigned the graduate course in statistical mechanics for my teaching, I decided to use it to learn the Landau-Khalatnikov theory of superfluid ^4He , generalizing each step of their argument to the much more intricate tensor order parameter that characterized pairing in superfluid ^3He .

To my great surprise, Lee and Reppy showed up for my first lecture and stayed for the entire course. Lecturing to an audience that included Dave and John inspired a level of clarity and precision that I have only rarely attained. One of the things that painfully emerged was the generalization of the irrotational flow of superfluid ^4He , to what is now called the Mermin–Ho relation for the A-phase of superfluid ^3He . As the course ended, John paid me a compliment that I still cherish, 40 years later. “Landau,” he said, “would have been proud of you.”

A quarter of a century later Dorothy and I spent an amazing week in Stockholm, among Dave’s guests at the 1996 Nobel Prize ceremony. Almost as good as winning one oneself. In fact better, since one is spared the harassment that starts that week and never really stops.

Today, as Dave and John both turned 90 a couple of months before I turned 86, they offer me yet another kind of inspiration. May I spend the final years of my 80’s with as much energy and verve as they both spent theirs.