ten the lessons of the lab-to-lab experience. Spiraling tensions have led to a cutoff of almost all US–Russian nuclear cooperation. Yet, although the conditions of the 1990s will not be re-created, it remains true that the US and Russia share fundamental interests in nuclear safety and security. US and Russian technical experts are still able to cooperate toward those ends, and their personal relationships, based on trust and professional respect, can still help to overcome obstacles that officials negotiating at headquarters would find more difficult to breach.

One hopes that *Doomed to Cooperate* will help a new generation of US and Russian officials learn the lessons from the 1990s and allow the experts to reengage in the effort to prevent catastrophe, build understanding, and explore new technologies and scientific frontiers.

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Why Quark Rhymes with Pork

And Other Scientific Diversions

N. David Mermin

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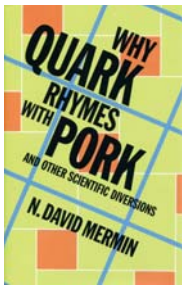
The contents of many nonfiction books can be summarized as "the blurb spread thinly," but that's an accusation that cannot be levied at David Mermin's new essay collection, *Why Quark Rhymes with Pork: And Other Scientific Diversions*. The best summary I could come up with is "things David Mermin is interested in," or at least was interested in at some point during the past 30 years.

That isn't as undescriptive as it seems. Mermin is a Horace White Professor of Physics Emeritus at Cornell University and a well-known condensed-matter physicist. He is active in science communication and famous for both his dissatisfaction with the Copenhagen interpretation and his obsession with properly punctuating equations. That's also what his essays are about: quantum mechanics, academia, condensed-matter physics, writing in general, and obsessive punctuation in particular. *Why Quark Rhymes with Pork* collects all of Mermin's Reference Frame columns published in PHYSICS TODAY from 1988 to 2009, updated with postscripts, plus 13 previously unpublished essays.



The earliest of Mermin's Reference Frame columns stem from the age of handwritten transparencies and predate the arXiv, the Superconducting Super Disaster, and the "science wars" of the 1990s. I read those first essays with the same delighted horror evoked by my grandma's tales of slide rules and logarithmic tables, until I realized that we're still discussing the same questions that Mermin did 20 years ago: Why do we submit papers to journals for peer review instead of reviewing them independently of journal submission? Have we learned anything profound in the past half century? What do you do when you give a talk and have mustard on your ear? Why is the sociology of

science so utterly disconnected from the practice of science? Does anybody actually read *Physical Review Letters*? And, of course, the mother of all questions: How do we properly pronounce "quark"?

The most recent essays in the book mostly focus on the quantum world and just what is and isn't wrong with it. They include the most insightful—and yet brief—exposition of quantum computing that I have come across. Several of the previously unpublished pieces are birthday speeches, summaries of lectures, or obituaries. The reader also hears again from Professor Mozart, a semifictional character that Mermin introduced in his Reference Frame columns.

Even though some of Mermin's essays are accessible for the uninitiated, most of them would likely be incomprehensible to those without some background in physics, either because he presumes technical knowledge or because the relevance of his subject will not be clear to the reader. The first essay is a good example. It channels Mermin's outrage over "Lagrangeans," and even though written with both humor and purpose, it criticizes a spelling that I doubt nonphysicists would perceive as properly offensive. Likewise, a 12-verse poem on the standard model and elaborations on how to embed equations into text will find their audience mostly among physicists.

My only prior contact with Mermin's writing was with a Reference Frame column from May 2009, in which Mermin lays out his favorite interpretation of quantum mechanics, QBism. Proposed by Carlton Caves, Christopher Fuchs, and Rüdiger Schack, QBism views quantum mechanics as the observer's rule book for updating information about the world. In his column, Mermin argues that it is a "bad habit" to believe in the reality of the quantum state. "I hope you will agree," he writes, "that *you* are not a continuous field of operators on an infinite-dimensional Hilbert space."

I wrote a response to that column lamenting that Mermin's argument was "polemic" and "not very insightful," offhand complaints that PHYSICS TODAY published in September 2009. Mermin replied that his column was "an amateurish attempt" to contribute to the philosophy of science and quantum foundations. But while reading *Why Quark Rhymes with Pork*, I found his amateurism to be a benefit: In contrast to professional attempts to contribute to the philosophy of science (or linguistics, or sociology, or scholarly publishing), Mermin's writing is mostly comprehensible. I'm thus happy to leave further complaints to philosophers.

Why Quark Rhymes with Pork is a book I'd never have bought. But having read it, I think you should read it too, because I'd rather not discuss the same questions 20 years from now.

And the only correct way to pronounce quark is, of course, the German way, as "qvark."

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Key Nuclear Reaction Experiments

Discoveries and Consequences

Hans Paetz gen. Schieck

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Nuclear physics is one of the most difficult topics in science. On the one hand, nucleons are composite objects, constituted of quarks and gluons, and on the other, they combine into highly complex many-body systems. Nuclear-physics experiments are expensive; they require complicated particle detectors in addition to nuclear accelerators that generate particles fast enough to penetrate an atom's electron cloud and react with a target nucleus. Additionally, it is challenging to understand enough nuclear-physics theory to carry out present-day research in nuclear medicine, nuclear reactions, stellar evolution, and other hot topics of nuclear science.

Hans Paetz gen. Schieck's new book, *Key Nuclear Reaction Experiments: Discoveries and Consequences*, aims to provide a basic overview of the theory and practice of nuclear physics. A few decades ago, Theo Mayer-Kuckuk wrote *Kernphysik: Eine Einführung* (B. G. Teubner, 1984), a concise and relatively simple book introducing the reader to the basic concepts of nuclear physics. A similar book by Walter Meyerhof, *Elements of Nuclear Physics* (McGraw-Hill, 1967), exists in the US but is out of print. Schieck's book is comparable to those in style, but it is focused on nuclear reaction experiments. It might therefore be useful for a one-semester course that gives a general introduction to nuclear physics. It can also be used by experienced researchers who have little knowledge of complementary aspects of their field.

Key Nuclear Reaction Experiments occasionally assumes more knowledge of nuclear physics than a beginning reader would possess. As early as chapter 2, for example, the reader has to know such basic concepts of quantum mechanics as Fermi's golden rule. However, the author tries to keep such prerequisites to a minimum and derives most results from scratch or intuitively. The text and derivations are concise and the figures are well drawn; they effectively guide the reader through the main concepts under discussion.

In his relatively short volume, Schieck manages to cover a remarkable range of nuclear reactions that test the geometry of nuclei. In chapter 4, which introduces those reactions, he explains differences in neutron and proton matter distributions, the experimental setups used to ascertain those differences, and the connection with other nuclear systems such as neutron stars. In a follow-up in chapter 5, he presents the newly blazed path to the discovery and understanding of nuclear halo systems and vividly describes loosely bound three-body systems, also known as Borromean systems. Perhaps a few more words could have been said about Efimov states, which manifest some of the most beautiful aspects of feebly bound three-body systems.

In its middle chapters, the book takes a sudden turn into the particle zoo. Schieck focuses on the parts of the zoo that are of main interest to nuclear physics, including the neutron, quarks, and gluons. He also discusses some of the history of nuclear physics, such as the discovery of the neutron and the development of nuclear accelerators. From there he covers a range of nuclear experiments and phenomena, including direct nuclear reactions, such as stripping reactions; the nucleon–nucleon interaction and its symmetries; Mott scattering;