

SPECIAL ISSUE

EVERYDAY PHYSICS

The setting: A social gathering. People of diverse backgrounds. Many separate animated conversations. You, the scientist, milling about smartly, are introduced to someone new. Pleased to meet you. Likewise. Pleasantries ensue, including the inevitable, What do you do? I'm a (fill in the blank with your scientific specialty). Oh, how interesting.

We've all been there. Too often, what happens next is an awkward silence. As scientists, we should all be concerned about how the general public perceives us and our profession. Most people are not scientists and really don't understand how science is done. To the laity, modern physics in particular seems remote. Huge particle accelerators lie in underground tunnels; nuclear-powered space probes speed toward their planetary destinations; individual atoms are prodded and probed; the bizarreness of quantum mechanics is confirmed in the lab. But the laws of physics apply to matter and energy everywhere—in our living rooms, gardens, and motor vehicles, as well as on the surface of a neutron star. To imbue our nonphysicist friends, families, and neighbors with the excitement and importance of our field, we should perhaps engage them first where the physical world is most immediate—in their everyday lives.

The feature articles in this special issue of PHYSICS TODAY set out to explore the physics behind some very familiar phenomena, and, in doing so, to arm you with enough everyday physics to charm and enthrall others. But there's more to the physics of the everyday than its educational value. The five topics selected also represent areas of active research.

Consider the social situation described above. If a friend calls your name over the general hubbub, you're able to turn in your friend's direction without thinking about it. Yet the beauty of science is that we *can* think about it, and Bill Hartmann has done just that. In "How We Localize Sound" (page 24), he takes us on a compelling acoustical journey of research, from the pioneering work of Lord Rayleigh in the last century to the state-of-the-art anechoic chambers used today to explore the perception of sound.

A daily experience that is universal is eating. In

"The Virtual Cook: Modeling Heat Transfer in the Kitchen" (page 30), Harold McGee, Jack McInerney, and Alain Harrus tell us of some recent investigations into the cooking of meat. They cover the physics of roasting, boiling, and frying. Here in the US, you may well have a turkey later this month, and it's likely to be stuffed with physics.

As Tony Kelley and Bill Clyne point out in "Composite Materials—Reflections on the First Half-Century" (page 37), such materials frequently occur in nature. Bone and wood are both composites. But it's only fairly recently that humans, guided by the physics of materials, have both mimicked and gone beyond nature's ingenuity to produce a remarkable array of artificial composites, useful in both high-technology and everyday materials. The metal tennis rackets of the 1970s were stronger than their wooden (hence composite) predecessors, for example, but today's rackets made of new composites, including carbon fibers, have regained the upper hand.

Our technological, global society has come about, at least in part, through the shared experience of watching television. Yet the vast majority of people have little inkling of how a TV set works. In the article "TV Goes Digital" (page 42), Louis Bloomfield, demystifies much of this ubiquitous form of entertainment. He shows how each subsequent development—from black-and-white TV through color to the up-and-coming digital broadcasting technology—has been incorporated into our living rooms.

Whether you are sealing an envelope, driving a car, or baking bread, stickiness plays a role. Yet as Ludwik Leibler and Cyprien Gay point out in "On Stickiness" (page 48), it is surprisingly difficult to quantify. When you remove your finger from a honey-smeared surface, you'll feel the honey's stickiness. But you can extract your finger more easily from a full jar of honey, which, in that sense, isn't sticky.

You are our way of reaching out to a broader audience. We hope these articles will inform and entertain you—and, with your help, do the same for your nonscientist acquaintances.

STEPHEN G. BENKA
CHARLES DAY