

Random Walk

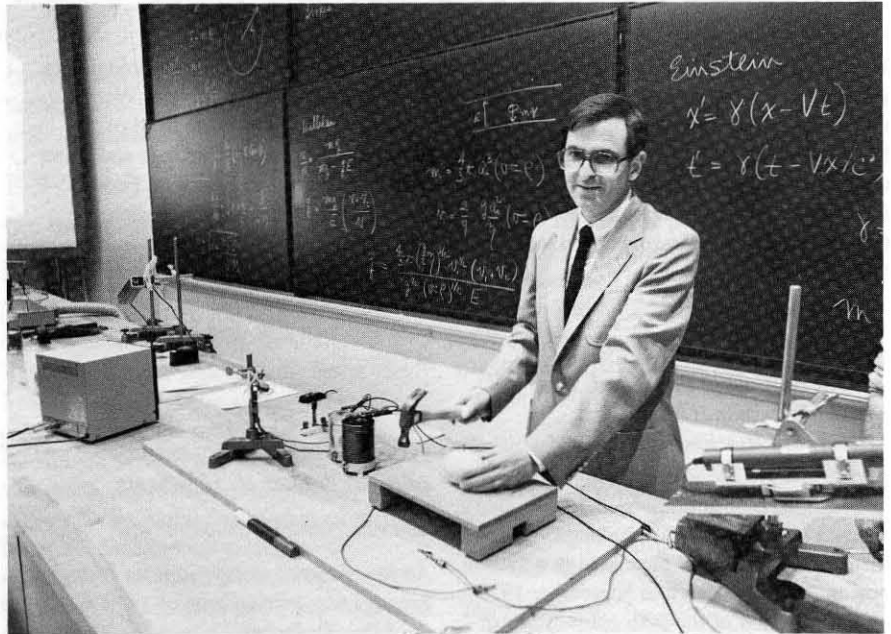
Sharing the Wealth

CALTECH students — bright, probing, and wise in the ways of academe — are quite likely the most challenging gang of intellectual toughs any science teacher could ever face. Imagine, then, a teacher who could elicit such comments about his freshman physics course as: “Some of the lectures brought tears to my eyes. The rest were merely incredible.” “Great lecturer: enthusiastic, clear, entertaining . . .” “Several students commented he was the best lecturer they ever had.”

The object of this praise (gleaned from the student-published *Teaching Quality Feedback Report*) is David Goodstein, professor of physics and applied physics, who is considered by students and faculty alike as something of a natural resource — perhaps the pedagogical equivalent of the Alaskan North Slope oil fields.

Now Caltech seems about to share its wealth. Goodstein and his colleagues are now embarking on an ambitious effort to produce a physics telecourse that will combine the visual pizzazz of television with the academic rigor of high quality college-level teaching. The first section of the course is entitled “The Mechanical Universe,” and in 26 half-hour programs Goodstein will cover the basics of classical mechanics, including such topics as the laws of motion and force. As a dividend, the group plans to put on a one-hour television special for prime-time distribution. Producing the \$2-million series will take about two years, and it is to be followed by courses entitled “The Electrical World” and “Relativity/Space and Time.” Together the three projects will complete the sequence of an entire year of standard introductory college physics.

The high promise of “The Mechanical Universe” has already been recognized in educational circles; it was one of only six



A top-notch teacher, physicist David Goodstein, with some of the tools of his trade.

projects (of 227 submitted) recently awarded development funds from the Corporation for Public Broadcasting/Annenberg School of Communications. The Caltech telecourse received a grant of \$1 million, contingent upon completion of a pilot program and the commitment of another \$1 million in matching funds from other sources.

The series will be no mere succession of talking heads. Location shooting and special effects such as the computer graphics artistry of JPL's James Blinn, renowned for his stunning depictions of the Voyager planetary flybys, will be included. Blinn is already hard at work figuring out how to bring to animated life the basic equations governing classical mechanics, as well as scenes illustrating physical laws applied to such realms as space travel. There will also be discussions of how the laws of conservation of angular momentum help scientists understand hurricanes, fire storms, and the shape of galaxies and the solar system. Basic laws will be applied to space navigation, to black holes, and to understanding how sound can break a wine glass and why the Tacoma Narrows Bridge collapsed.

The lessons in physics will be interwoven with insights into the history and spirit of science. For example, Goodstein will host a guided tour through the labora-

tory notebooks of Robert A. Millikan, to reveal how data are treated — and sometimes mistreated — in science.

The course will have sound academic underpinnings, covering, for example, a solid introduction to the mathematics — including calculus — needed to understand classical mechanics. It will not be assumed, however, that students have had calculus beforehand.

Goodstein expects the telecourse to prove valuable to students and teachers in high schools, community colleges, universities, and companies with continuing education programs. Staffing the course are executive producer Sally Beaty of the Corporation for Community College Television; project manager Don Delson, producer Peter F. Buffa, and associate producer/writer Glenn Kammen. And Steven Frautschi, professor of theoretical physics, will be in charge of writing a textbook that Caltech's own students will be able to use.

The national advisory committee for the project includes famed movie producer and Caltech alumnus Frank Capra; the honorable Shirley Hufstедler, Caltech trustee and former Secretary of Education; Frank Oppenheimer, director of the Exploratorium in San Francisco and also an alumnus; and other prominent figures in science communication and education. □

— Dennis Meredith